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COMMUNITY PARTICIPATION IN WATER SUPPLY SCHEMES

*A TRAINING MANUAL FOR MEMBERS OF
WARD WATER COMMITTEES*

A translation from the Malayalam original

Edited and presented by

P. HARISH KUMAR
R. SURESH

September 1989

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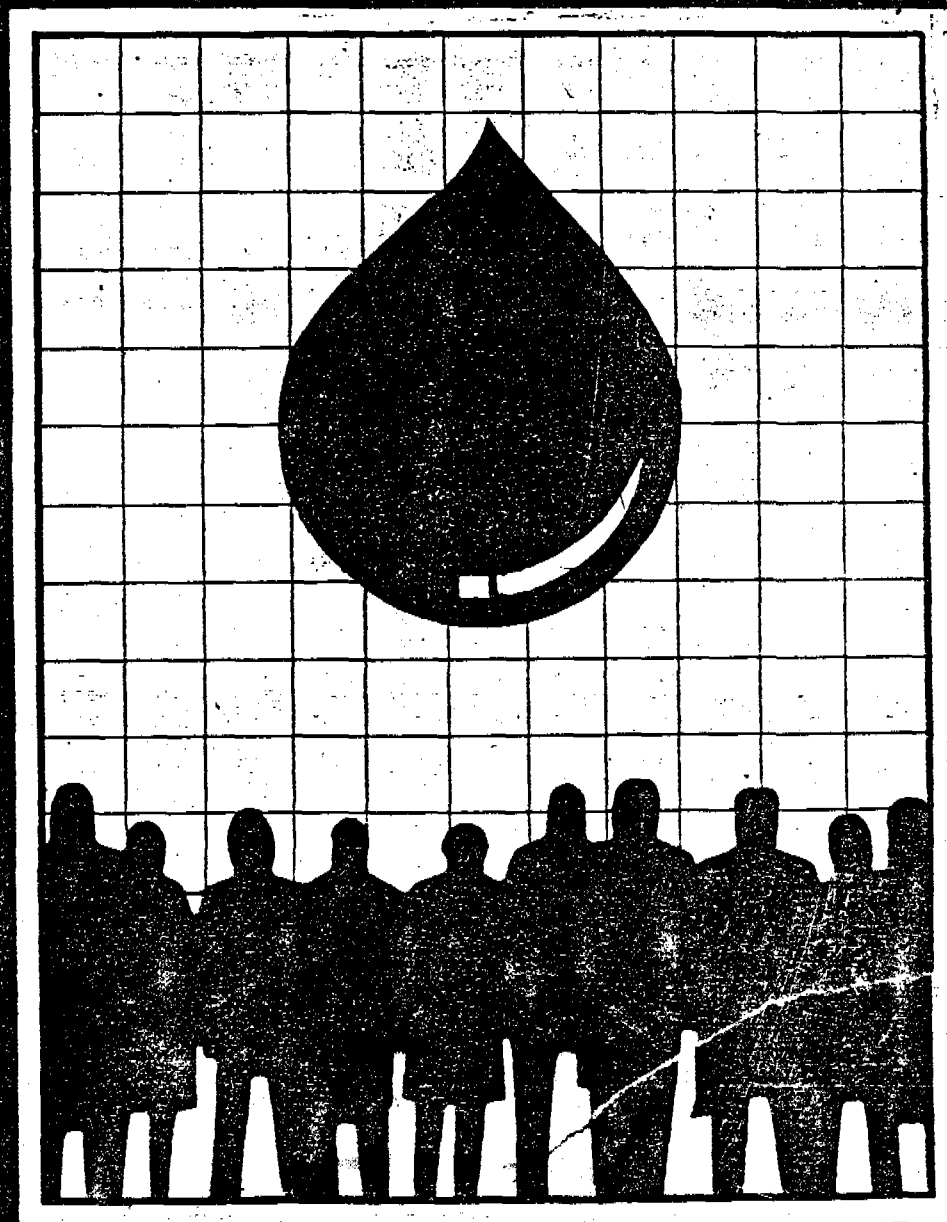
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WARD WATER COMMITTEES*



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PREFACE

The Proclamation of the Drinking Water Supply and Sanitation-Decade focussed attention on the importance of providing drinking water facilities through schemes that involved communities at all stages of the planning and implementation of a water supply scheme. Many countries, including India, have taken up the challenge of achieving the Decade's objectives and have decided to provide drinking water to all by the year 1990.

Until recently, planners of rural water supply schemes tended to focus only on the technical design, construction and maintenance aspects of water supply schemes. Hence, at most stages of the implementation of these projects, only engineers or technocrats were involved. From the experiences gained from projects all over the world, attention has now been directed towards the necessity for incorporating community aspirations and needs at all stages in the execution of a project. Considered in this light, environmental sanitation and health education are areas which acquire importance when rural water supply schemes are planned. From another point of view, the large gap in terms of knowledge and perceptions between technocrats and the village community, can be bridged through systematic orientation and training. This, in turn, necessitates the creation of institutions at the user-level that will act as conduits and channels for the flow of information, knowledge and opinion in both directions.

Socio-Economic Units, Kerala was established with a mandate to experiment with the possibilities of garnering community support and enthusiasm for the implementation and management of local water supply schemes. An average ward in Kerala has a population of about 8-10,000 people, and it was thought that this would be an appropriate level at which an interface between the technocracy and the community could be established. Hence the proposal to establish Ward Water Committees in all the panchayats under the Indo-Dutch-Danish rural water supply schemes. This manual has been designed and produced as a training aid for members of WWCs, with the hope that the first bridges could be established through an orientation programme built around the contents of this manual.

This manual has 11 chapters, touching on the different aspects of RWS that we thought were essential for the orientation of ward members. Experts from the Kerala Water Authority and Socio-economic Units are the major contributors to this book. Messers Martin De Graaf, C.O. Kurian, Issac John, R. Unnikrishnan Nair, T.N.N. Bhattathirippad, Manacaud Sukumaran Nair, George Varghese and R. Suresh deserve special thanks in this regard.

Manacaud Sukumaran Nair and J. Hubert edited the materials for publication in the original Malayalam edition of this book. Rank Advertising Consultants of Ernakulam gave final touches and shape to this book.

With the hope that this manual facilitate support for the effective functioning of ward water committee members, I have privilege in presenting this book to you.

K. Balachandra Kurup
Executive Co-ordinator
Socio-Economic Units, Kerala

Trivandrum
1.6.1989

CHAPTER 1

SOCIO-ECONOMIC UNITS: WHY, AND FOR WHAT ?

K. Balachandra Kurup

**SOCIO-ECONOMIC UNITS,
KERALA**



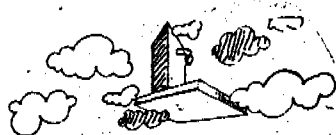
The Dutch and Danish governments provide financial and technical support for the establishment of rural water supply schemes in 73 panchayats in Kerala. The Kerala Water Authority implements these schemes through the award of contracts, the execution of which is governed by KWA's staff positioned all over the State. With a view to encouraging an integrated approach to implementation, drawing upon local community resources and opinions from the planning stage itself, Socio-Economic Units were established in the Northern (Calicut), Central (Trichur) and Southern (Quilon) Kerala, the activities of which are co-ordinated by the Co-ordinating Office based at the Kerala Water Authority Head quarters in Trivandrum. The Dutch and Danish governments fund the activities of these units which, in the long term, are expected to be integrated into the Kerala Water Authority. Professionals with experience and training in Social Science, Health Education and Community Organisation have been appointed in these three units.

The objectives of the Socio-Economic Units are briefly listed below.

- Ensure people's participation especially women's participation in the construction, operation and maintenance of water supply projects.
- Ensure that the programme design and the functioning benefits at least 90% of the people in the society.
- Conceptualise and organise programmes related to health education and sanitation.
- Develop systems that are helpful in monitoring and evaluating project activities, progress and failures.

WHY COMMUNITY PARTICIPATION?

Most development programmes in Kerala do not consider enough the importance of people's participation. Therefore, people often view such programmes with suspicion and prefer to keep away from the programme. This eventually leads to the failure of the programme. 'Experts' often believe that lay people are too incompetent to be included in the planning process. This attitude naturally leads to alienation of the people. In return, the community adopts an indifferent attitude towards any development programme.



Further, society comes to expect that all development activities will be taken up by the Government through experts. Later, well into the implementation of the programme, efforts to mobilise people's support and participation does not make much headway, and enough confidence is not instilled in the community; eventually this results in the failure of the programme. Many of the Dutch-Danish assisted water supply and sanitation schemes are in different stages of completion. The areas of operation for these projects were selected in 1982-84. It was realised later that except in the northern region, there has been little community participation at the planning stage. Most of these projects are expected to be completed by 1989-90.

With these ideas in mind, SEU plans activities to ensure people's participation in water supply and sanitation programmes.

WARD WATER COMMITTEE

People's participation in a social development programme should be viewed as something more than a concept. It is rather a flow that determines the success of a project. This should become the absolute reality. It is with this in view that Ward Water Committees are formulated. These committees ensure equal representation with emphasis on women's participation. These committees are responsible for the water supply and sanitation status of their respective areas. Socio-Economic Units, in collaboration with the Kerala Water Authority and the Health department provides sufficient support to these Committees. There is good reason to emphasise women's representation. They are the managers of homes who are responsible for the health of the family. The time, energy and effort spent by women in collecting water for household requirements have a direct effect on the health and economic status of the society.

The Ward Water Committee of each place is responsible for site selection of stand posts, latrines, and their construction, and discussions and decision making of such public facilities. The operation and maintenance of these facilities are also responsibilities of the WWC. Socio-Economic Unit staff provide a link between the beneficiaries, panchayats, KWA, voluntary organisations, etc. Because the rural population in Kerala is enthusiastic about having safe water supply at their doorsteps, it is not difficult to mobilise people's participation.

HEALTH EDUCATION

Culture and traditions have an important role in influencing the health habits of people. Ward Water Committees, which include representatives from different social strata can exert a considerable amount of influence on people's health habits. Besides being able to assist in the construction and commissioning of programmes, they can also be of great use in operation and maintenance. These Committees are also expected to assist in health education campaigns and in creating awareness to the people.

Cleanliness and environmental sanitation is not something very new to the people of Kerala. Yet it is necessary to strengthen the awareness on the importance of protected water and environmental sanitation. The health status of a family is determined by the quality and quantity of water used by them. Water-related and water-borne diseases recur frequently through the indiscriminate use of water without proper knowledge of how to use it, and how much water to use.



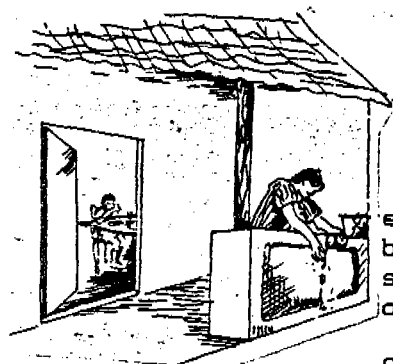
Socio-Economic Units will identify water related problems with the help of WWCs and try solving these problems with the help of the concerned government departments. We also organise and conduct training classes, free medical camps, and clear doubts in people's minds on various related issues.

The health habits of people depend on their cultural and traditional backgrounds. How these backgrounds influence health habits is a matter of much research. It may be very difficult even to make people adaptable to minor changes. For example,

- a) How many people are of the habit of washing their hands and faces before and after taking food? What can be done to cultivate this habit?
- b) How to wash hands and face without using too much water?
- c) What are the regional attitudes and health practices?

Health education efforts can succeed only if all the members of a community cultivate hygienic habits. Here are a few points which can set a model to others.

- Removal of wastes.
- Proper water collection, use, and handling.
- Personal hygiene
- Disposal of waste water and excreta.



Preventive measures for water-related diseases.

It is not possible to bring effective health education by mere campaigning. Work plans should be attached more importance which only can bring serious changes in the health and hygiene habits of people.

SANITATION

Health and Sanitation are inseparably related. Sanitation has assumed so much importance that it determines the course of social and economic development of a society. Previous experiences prove that water supply schemes without a sanitation element are failures. Socio-Economic Units gives sufficient emphasis to sanitation activities in its water supply schemes through experimental sanitation programmes. It ensures appropriate technology and sufficient financial funding for the construction of low-cost twin-pit latrines. People below the poverty line can own a latrine by contributing just 25% of the cost of construction. The objective of the Socio-Economic Units is to provide as many low cost latrines as possible. We have the whole-hearted support of KWA, Panchayat Authorities, Voluntary organisations and the general public in this.

EVALUATION

It is not possible to evaluate water supply and sanitation projects on their own rights, and health education activities on just health considerations. Only reliable data and information on the influence of health education activities on water supply and sanitation programmes can lead us to correct and complete inferences. This requires true and accurate statistics. Analyses of such statistical information alone can facilitate a just evaluation. This means collection of accurate baseline information. Socio-Economic Units intends to collect information that will contribute to the efficiency and effectiveness of activities like site-selection for standposts and latrines.

The policy of the Socio-Economic Unit in the formulation of a programme plans are so wide ranging that planning requirements of each regional unit of the Socio-Economic Units is taken into account. This means Socio-Economic Units implement programmes that are of maximum use to the people.

CHAPTER 2

OUR HEALTH IS OUR LIFE

Martin de Graaf

Nobody can live without a body. This very weak and fragile body which can collapse at any moment is the foundation of life. If our body falls apart, our dreams fall apart. Mankind has progressed scientifically, quite a lot. He has worked wonders in blue skies and high seas. But could he change an inch of the basic structure of his body? The answer is no. Life has always been a prisoner to his body.

Think once more. We can see that this argument is not completely true. We are not in the prisoner's cell of our body. Because, we are not dependent on our body, but our body is also dependent on us. If we need to lead a happy life we have to keep our body in good shape. This makes life happy to us and our life.

Who is to do this? Should the Doctor take care of health care? Or is it medicines? It is only you who is responsible to take care of your body. You are the sole authority to determine the condition of your health. Doctors, medicines and health educators can only show you the way to lead a healthy life. It is only you who should act accordingly and keep good health. The world has conquered most of the diseases. But if you do not keep fit only you are responsible for it. Remember, your health is your life.

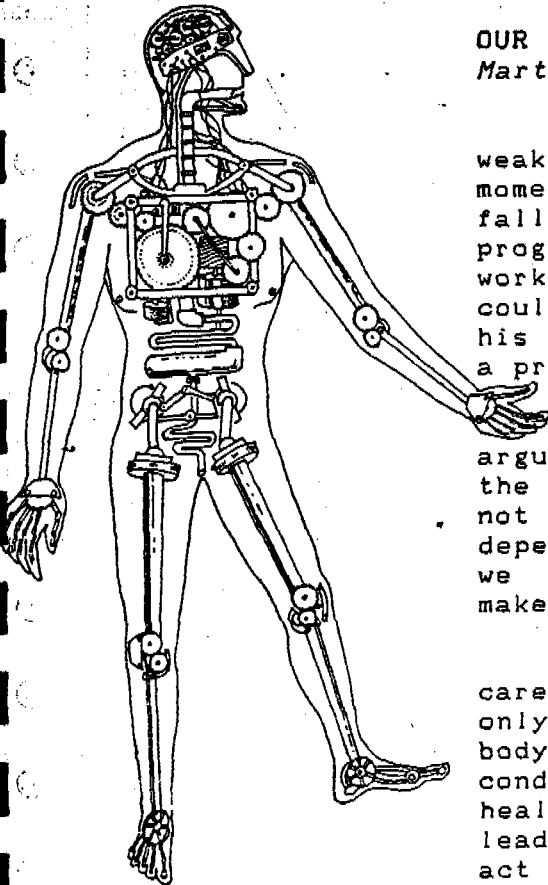
WHAT CHANGE CAN HEALTH BRING ?

A healthy and fit body can get us a job and help us keep it. A healthy person here means a person who doesn't have to spend time and money on doctors, medicines and hospitals. Your health can bring happiness and welfare, not only to you but also to your family. Come to think of the worries that your illness can cause to other people. If your body is healthy, your mind will also be healthy. Your ideas become healthy. So be the master of your body by taking good care.

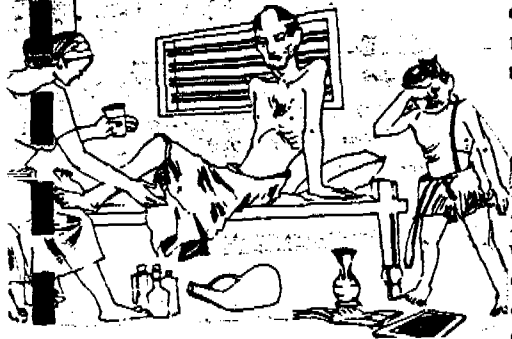
HOW IS THAT POSSIBLE?

To be an owner of a healthy body, there are three things that are very important.

1. Understand the right things
2. Choose the right way
3. Act accordingly.



Your health is the result of your daily activities. There can be no better understanding without proper knowledge about the functioning of our body and the best health habits. There can be no results for anything done without better understanding.

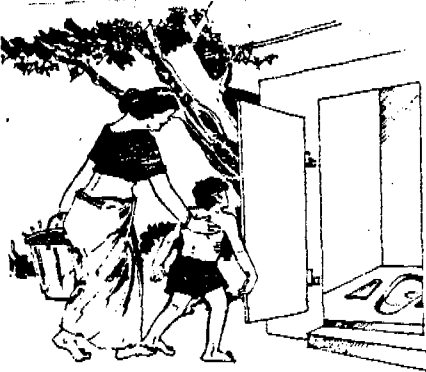


There is no excuse for lack of health. You must have it. You should find out what is required and work for it. Some may cause a problem of practical difficulty. Yet, you have to work for it. Use only clean water. Take only clean food. Keep your house and surroundings clean. All your activities should support maintenance of your good health. This should become a habit.

WHAT CAN YOU DO?

Elsewhere in this book there are chapters which deal in detail about water and sanitation. Here are a few practical points that may help you and your family to change your health habits.

- Collect water only from safe sources.
- Water thus collected must be stored well.
- Drinking water should always be protected and stored.
- It is safer to boil it before using it to drink.
- Do not let water stay stagnated in and around your house.
- Keep clean the places where you wash your clothes.
- Wash your hands before and after you take food.
- Bathe every day.
- Make and use a sanitary latrine.
- Make sure that your children are also taught to use latrines.
- Keep your latrine clean.
- Wash your hands clean with soap after using latrine.
- Do not let garbage gather around your house



WHAT CAN YOU DO WITH NEIGHBOURS?

Some health-related problems can not be solved by an individual alone. You may be able to work something together with your neighbours. You may discuss common problems with them and find an acceptable solution.

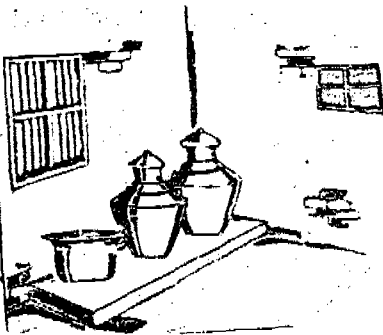
- Prevent water from staying stagnated in the surroundings
- Keep surroundings of well and standposts clean.

- Make provision for waste water run-off.
- Do not bathe or wash clothes at near a public standpost.
- Co-operate in keeping public wells clean.
- Avoid open air defecation.
- Those who can not afford private latrines can join together to build community latrines and ensure that all beneficiaries use them properly.
- Report major repairs or faults of water supply systems to the notice of concerned authorities.
- Make arrangements for immediate and instant removal of garbage.

WHAT CAN YOU DO WITH SOCIETY ?

There are a lot of good things that one can do together with society as a whole. A lot of useful things to the society.

- Cleaning and protecting public wells.
- Construction of public standposts.
- Financial participation for construction of community latrines.
- Listening to health educators and encouraging others also towards better health habits.
- Report to authorities, any major faults or repairs noticed in public water supply systems.
- Ensure that there is regular and sufficient water supply through public standposts.
- Co-operate in the construction of borewells.
- Make arrangements to repair faulty handpumps without delay.

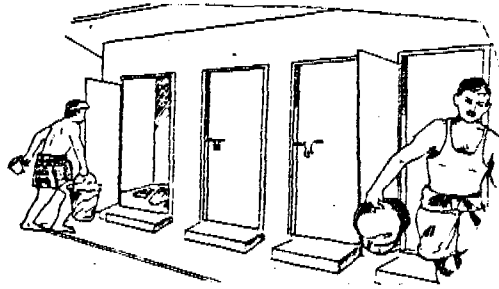


Rather than being told by others, what you should do, you should think and decide for yourself what you can do and come forward to do what you think you can do.

Hoping that all social work shall be done by the government is futile. With this attitude, it takes a long time for things to happen. You should also realise that the government may not have the money for this at all times. The changing governments or the local self government bodies cannot do much in these matters. Instead of just sitting on the hope that the government will do everything that we need, it is better that we volunteer to come forward and do what we can for what we want. Ward Water Committees are one such well planned, well organised move. Every one may not get representation in these committees. But there are a lot of things to

remember when organising such committees.

- Water committees should be kept free of politics.
- While the number of members of these committees should be kept at the minimum, it should not lose its representative identity.
- Instead of taking up too many responsibilities, take up only those which can be fulfilled.
- Identify and plan well in advance, time-bound action plans for each activities.
- Keep close watch on financial aspects. There is no place for corruption in social service activities.
- If you find that activities taken up by your committee is failing, stop work and review why your activities failed.
- Your successful ventures will be an excellent model to others.



CHAPTER 3

COMMUNITY PARTICIPATION: NEED, PROBLEMS AND APPROACHES

C.O. Kurian

Introduction

This chapter deals with the problems involved in community participation for water supply and sanitation schemes in developing countries like India.

It has been widely accepted that the success of development activities rests with the creative participation of communities. Community participation, here, means the involvement of the residents of a particular place where a developmental activity is envisaged. Involvement of people in planning, decision making, implementing, evaluating etc. are areas where people can participate.

Programme planning stages should recognise power of the people as the main element in the success of each scheme. The common belief that people know nothing and that experts are the ones who decide what people need, should change.

Today community participation, has become a formality and that is the end. We have to face political, social and cultural elements which impede complete community participation.

2. Characteristics of Kerala

Kerala possess more political and cultural diversity than other states in our country.

Consumer awareness is gathering momentum in our state at a faster pace than anywhere else. In this context, the orientation of service in social work is declining. Most people think that development activity is the government's responsibility and hence no community participation is required. The excessive political awareness affects not only social life but also inter-personal relationships. Indiscriminate protest of everything supercedes creative criticism.

3. The situation

Those schemes which failed to recognise that community participation is the foundation stone of success of all developmental activities have failed. Failed because, people's beliefs, attitudes, problems, cultural, financial status, other backgrounds were not taken into account while implementing schemes. In most cases people came to know of schemes only after they had commenced. For example people came to know of water supply schemes they were to benefit from only after pipe-laying had started. The attitude of authorities is: 'why consult illiterate, ordinary people?'. This should change. A healthy social change can take place only if there is complete community participation.

4. Advantages of community participation

1. Benefits

Development activities can gain more only from creative community participation. The quality of the scheme is more important than completion of the scheme.

2. Cost reduction

The cost of each scheme can be drastically reduced if local residents of a project area come forward to co-operate in developmental activities.

Beneficiaries of projects can contribute to cost reduction by contributing to the project in labour or in kind. The cost can be reduced also by adapting appropriate technology and good administration.

3. Sense of Value

People become more committed to the project when their opinions are valued and accepted. It also helps in strengthening social relationships among people.

4. Model

A project implemented with the help of community participation creates grounds for fresh organisational arrangements, energy, beliefs etc. This sets a model for other people in other project areas to participate in developmental activities.



5 Sense of Responsibility

Each project implemented with the help of community participation causes pride to the people of the area and this in turn creates a sense of responsibility in each one's mind.

6 People's Needs are met

When people are consulted in deciding projects their needs are met. Thus the money spent for the project can be said to be spent for meeting felt needs.

7. Overcome Mistakes

When people are also part of deciding and designing and implementing projects, not only does it prove to be more effective but also it helps to overcome mistakes.

8. Utilise People's resources

Each person is an expert in his own field. If many such people worked together in a project there is guaranteed success.

9. Self-dependence

Depending on experts every time there is a problem causes undue delay. Minor repairs and faults can be rectified by any beneficiary. However depending upon experts for complex problems is not ruled out.

5. Community Participation : some problems.

a. Planning

Including People's participation at the planning stage itself determines whether the people need the project at all. However there need not be a consensus in such matters because political influences and lopsided in opinions can hamper the creativity expected in the decision making process.

b. Design

People of a project area are capable of providing relevant data and information required for the preparation of a design for the project. It need not be true always they may have a lot of ideas which do not consider the complexities or have any definite priorities.



c. Organisational set-ups.

There are a lot of advantages in incorporating local organisations in the implementation of a project. But Government agencies may not be willing to accommodate such local organisations. Thus it may simply not be possible to coordinate between the two different agencies in project activities.

d. Implementation

People can help a lot in completing the project faster and in time. But organising and controlling people for project work is a difficult task.

e. Operation and Maintenance

Problems of consumers can be instantly and immediately solved because part of the project implementors are volunteers from the same place. However it calls for expert advice and involvement for the rectification of complex problems. Moreover, the number of people who are willing to take responsibilities without remuneration is too small.

f. Beneficiary Contribution

Collecting a fixed part of the cost of project from beneficiaries has become an accepted practice. But still the desire and willingness to pay for the project may not be possible in every case.

g. Preference to public interests

When developmental activities are taken up, people have to forgo personal interests for public interests. However, there is a tendency to quit the project work when personal interests fail to find place. Keralites, as they are, have a tendency to pull out of voluntary work after the initial interest.

h. Evaluation

The involvement of people right from the beginning to the end of the project saves irresponsible, offhand remarks and criticisms about the project. It also helps develop a healthy approach towards the project. But strictly speaking, it involves problems of a proper orientation towards the whole matter.



6 Solutions, Practical Difficulties

The major challenge that a project will have to face from the village level will be the cultural and political resistance. Keralites are known for their interests in personal gains. Reorienting people towards dedicated social service is a very complex problem. Party fanaticism has assumed the role of the main obstruction to winning people's participation.

Unless development activities are viewed to be above political interference, the chances of completing a project that will really benefit people remains doubtful.



CHAPTER 4

COMMUNITY PARTICIPATION IN RURAL WATER SUPPLY SCHEMES

Isac John

People's participation is an essential element in the success of any water supply scheme. There is need for standardising the approach of including people's participation to gain their co-operation. It would also be appropriate to organise committees at ward, panchayat and district levels.

In this chapter we detail some characteristics of the personnel support and institutional structures necessary for the sustained participation of communities in RWS.

STANDPOST ATTENDANT

The ward committee will appoint a volunteer as stand post attendant with the following responsibilities.

1. See that minimal amounts of water are wasted and that the surroundings of the standpost are clean.
2. Take care of the surroundings of the standpost; see that no shrubs and grass grow around.
3. Keep the drain clean.
4. Ensure that consumers observe the following points:
 - handle the tap properly
 - do not wash clothes on the platform or near the standpost.
 - do not use drinking water for other purposes like watering plants
 - do not use water to wash domestic animals or automobiles.
5. Report any faults or repairs to concerned authorities immediately.

WARD WATER COMMITTEE(WWC) STRUCTURE

- | | | |
|----|---|---|
| 1. | Panchayat ward member | 1 |
| 2. | Lady representative (from women's organisation) | 2 |
| 3. | An active social worker | 1 |
| 4. | Representative from youth organisation | 2 |
| 5. | I.C.D.S Supervisor/Junior Public Health Nurse/any other representative from related departments | 1 |

Total 7

SEU member (ex-officio)



GUIDELINES TO SELECT WWC MEMBERS

The Panchayat committee members may use the following guidelines while selecting members for the WWC:

1. An elected representative from the ward.
2. Should be a resident of the particular ward.
3. Should be a beneficiary of this water supply scheme.
4. Should be a respectable and reliable person.
5. Should be literate.
6. If those who handle drinking water are mostly women, there should be a minimum of two women in the committee.
7. Should be above eighteen years of age.
8. Should be willing to offer voluntary service.
9. Should be willing to attend training classes.

RESPONSIBILITIES OF THE WWC MEMBERS

1. Assist the site-selection team in the process of site selection.
2. Assist in the process of acquisition of private property when necessary.
3. Help installation of standposts and solve problems likely to arise in future.
4. Organise people's participation for the implementation of the project and also in its future operation and maintenance.
5. Take action on stand post attendant's reports of misuse of drinking water.
6. See that stand post surroundings are kept clean and create awareness among beneficiaries on this aspect.
7. Health-related activities aimed at the residents of the project should be organised and SEU workers assisted.
8. In times of need when there are water related health problems, inform about it to the panchayat water committee.
9. Act on steps to solve major repairs of water supply systems in consultation with the Water Authorities.
10. Report major repairs to the concerned Water Authority.
11. Record and act on complaints lodged by consumers in the ward.
12. Extend support to the public and the concerned authorities whenever required.
13. Create awareness among the village population on the design, construction and the operation and maintenance of water supply systems and also organise health education classes.

HEALTH SUB-COMMITTEE

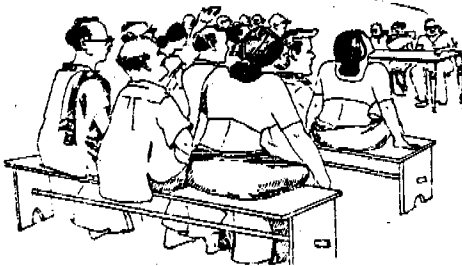
Two dynamic women and one man selected from the WWC should be given training in Health education and organisational abilities.

WWC MEETING - PROCEEDINGS.

1. Respective ward member shall be the president.
2. The committee will select the Secretary.
3. Meetings shall be held at least once in a month.
4. Organising meetings and recording minutes of the meeting shall be the responsibility of the Secretary.
- 5.a Any member failing in attendance for three consecutive meetings shall automatically forfeit his membership.
- 5.b New members to the committee will be elected in accordance with the normal guidelines.
6. Members not sufficiently active in the WWC may be removed from the committee depending on the consensus of other members.
7. Two members of the WWC shall be nominated to the Panchayat water committee.
8. The SEU will be responsible in identifying local organisations and social workers for the activities of the WWC.
9. Selection of Stand post attendant.

PANCHAYAT WATER COMMITTEE

1. Panchayat ward members
2. Non-political representative from the WWC
3. Assistant Engineer nominated by Kerala Water Authority
4. Assistant Engineer of the Electricity Board
5. Health Inspector
6. Panchayat Executive Officer
7. Village Extension Officer (if necessary)
8. N.S.S Programme Officer (if available)
9. I.C.D.S Officer/Supervisor (if available)
10. SEU representative



The Panchayat Water committee should be convened once in three months by the Panchayat President. The President shall preside over the meeting. In the absence of the Panchayat president, the Vice-President or the Executive Officer may preside over such meetings.

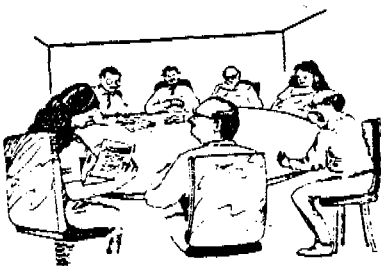
The Committee may issue special invitations to any other related department as and when required.

RESPONSIBILITIES AND DUTIES OF THE PANCHAYAT WATER COMMITTEES

1. Deliberate over problems not solved by the WWC.
2. Consider complaints and reports accorded by WWC.
3. Observe regularly the health status of the Panchayat, and use this information as the basis for the design and conduct of classes on health education for people in the panchayat area.
4. Help Water Authority in solving problems at the Panchayat level.
5. Assist Water Authority in collecting Water charges.
6. Supervise Operation and maintenance of water supply systems in the Panchayat.
7. Assist in taking action against water charge defaulters.
8. Assist in taking action against misuse of drinking water.
9. Extend all support to the WWCs.
10. Provide all necessary information to the District level committee.
11. Extend all support and supervise Link Workers and Health sub committee.

DISTRICT CO-ORDINATION COMMITTEE

1. District Collector
2. ADM
3. Members of the Parliament and the members of the Legislative Assembly
4. Panchayat Presidents
5. Kerala Water Authority Executive Engineer
6. KWA Assistant Engineer
7. District Medical Officer
8. District Health Education Officer
9. District Mass Education Officer
10. District Planning Officer
11. District Womens Welfare Officer
12. District Social Welfare Officer
13. District Youth Co-ordinator
14. Deputy Director (Education)
15. District Panchayat Officer
16. Project Officer DRDA
17. Project Officer ICDS
18. Medical Officer of the Primary Health Centres
19. Field Publicity Officer
20. District Information Officer
21. Block Development Officer
22. SEU members



The District Collector shall convene the co-ordinating committee once in six months and review trends in water supply, sanitation, health education and other related matters.

OBJECTIVES OF THE DISTRICT CO-ORDINATION COMMITTEE

1. Review of activities in the field of water supply, sanitation, health education etc.
2. Co-ordinate activities of departments working towards the same direction.
3. Expedite activities of the various government departments without causing any financial burden to the government.

CHAPTER 5

KERALA WATER AUTHORITY- STRUCTURE, FUNCTIONING AND RESPONSIBILITIES

R. Unnikrishnan Nair

Background

It was the responsibility of the Public Works Department to look after Water supply and Public Health activities in Kerala, until 1956. With the inception of the Public Health Engineering Department in 1956, these responsibilities came under the PHED. This department became an Authority, the Kerala Water and Waste Water Authority, through a government ordinance dated 1.4.1984. In 1986, the Kerala Assembly passed an act through which the Kerala Water Authority was born.

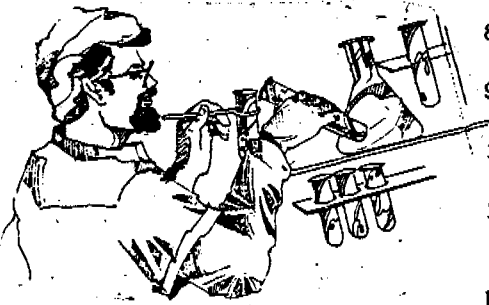
STRUCTURE OF THE AUTHORITY
(See Chart)

1. Chairman, appointed by the Government
2. Managing Director (a qualified and well experienced Chief Engineer)
3. Government Secretary in charge of Public Health. (Ex-officio)
4. Finance Secretary to government (Ex-officio)
5. Development Secretary to Government. (Ex-Officio)
6. Two government appointed representatives of the Local self-government establishments. (Government nominees if no Local self - government establishments exist.)
7. Scheduled caste-scheduled tribe representative (Government nominee)
8. Technical Member not below the rank of a Chief Engineer (Government appointed)

RESPONSIBILITIES OF THE WATER AUTHORITY

The Kerala Water Authority is responsible for the following functions according to the Kerala Water Authority Act.

1. Planning, implementation, operation and maintenance of water supply and waste water drainage.
2. Execution of water supply and drainage facilities to the government, private concerns or individuals on request.
3. Planning of the state's water supply and drainage requirements.
4. Fixation and revision of water charges and rates in water supply and sanitation schemes.



5. Determine standards for water supply and sanitation schemes.
6. Take care of all responsibilities of the PHED before the enforcement of the Kerala Water Authority Act.
7. Assess and train the manpower requirements for the implementation of water supply and sanitation activities in the state.
8. Conduct researches for the efficient functioning of the Kerala Water Authority.
9. Facilitate availability of drinking water and drainage facilities.
10. Take necessary steps to ensure uninterrupted water supply at times of emergency.
11. Undertake all activities notified in Government Gazettes.

FUNCTIONING OF THE KERALA WATER AUTHORITY.

The management of the Authority and control of employees of the Authority is the responsibility of the Managing Director of the Kerala Water Authority. The state has been divided, for operation and maintenance, into two regions, each under the charge of Chief Engineers. Trivandrum and Calicut are the respective headquarters of the South and North regions. A Chief Engineer based at Cochin is in charge of the Investigation, Planning and Design and Research activities. The quality of water in each area is also determined by him.

Each Chief Engineer is assisted by two Deputy Chief Engineers and a Superintending Engineer. The general administration of all schemes are managed by a Superintending Engineer. They are assisted by Assistant Executive Engineers and Assistant Executive Engineers, Assistant Engineers, Draftsmen and many other personnel. Administrative functions are taken care of by the Administrative Officer, Administrative Assistants, Office Superintendents and clerks.

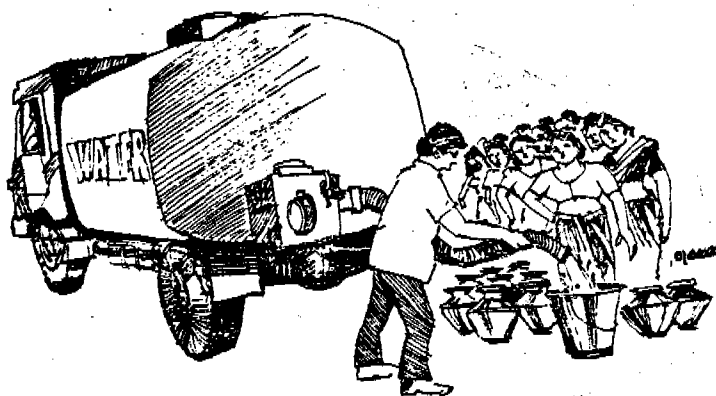
All Financial matters are managed by the Finance Manager and Chief Accounts Officer. He is supported by the Accounts Manager, Accounts Officers and Internal Auditors. The Secretary of the Kerala Water Authority organises conventions, seminars etc.

The Authority has complex activity plans. Dedicated technocrats and bureaucrats are vital elements of the successful functioning of the Kerala Water Authority.

Keeping in mind the efficient functioning of

the Kerala Water Authority, Kerala has been divided into two regions. Each region has been divided into Circles, Executive Divisions and Investigation, Planning and Design Divisions. At present, there are 31 executive Divisions, Six IPDs and nine circles under the KWA with about 6000 employees.

Government allocation for water supply, loans from financial institutions like the Life Insurance Corporation of India and World Bank, Bilateral assistance from Dutch and Danish Governments and water charges from the public are sources of finance for the working of Kerala Water Authority.



CHAPTER 6

FINANCIAL ASPECTS OF DRINKING WATER

T.N.N. Bhattathirippad

All Water supply schemes are expensive. That makes understanding - the financial aspects of water supply even more important.

There are two sides to financial aspects.

1. The Capital cost of a drinking water scheme.
2. Day-to-day production cost.

CAPITAL COST

Capital cost includes all expenses incurred upto the commissioning of a scheme. Small water supply schemes may not be successful in returning expected results. A state like Kerala requires integrated water supply schemes which use water from all rivers in the state. But it requires plenty of money.

Items on which expenditure is incurred for integrated water supply schemes are as follows. Although the list is incomplete, this can be useful as a model.

1. Identifying the source of water and preparations.
2. Processing of water.
3. Pumping facilities.
4. Water reservoirs.
5. Distribution network.
6. Transmission pumps for distribution networks..
7. Repairs and maintenance of roads and approaches.
8. Construction of residences for employees.
9. Construction of Office Buildings.
10. Equipment, materials and instruments.
11. Purification facilities
12. Salaries and wages.
13. Allowance for depreciation.
14. Acquisition of land.
15. Miscellaneous expenses

We should be aware that a water supply scheme, from planning stage through to commissioning, incurs a lot of expenses.

DAY-TO-DAY PRODUCTION COSTS

It is possible to calculate how much it costs to supply drinking water every day. This cost includes salaries of operators, cost of chemicals for purification, Electricity charges etc.

The Capital costs and daily production costs need not necessarily be the same in all places. It is the same with all times. The per capita expense for rural water supply in Kerala has been estimated at Rs.250/-. The production cost is Rs.0.80 for every thousand litres. Keeping in view the changed times, this has to be revised to Rs.500/ and Re.1/- respectively.

KERALA WATER AUTHORITY BUDGET

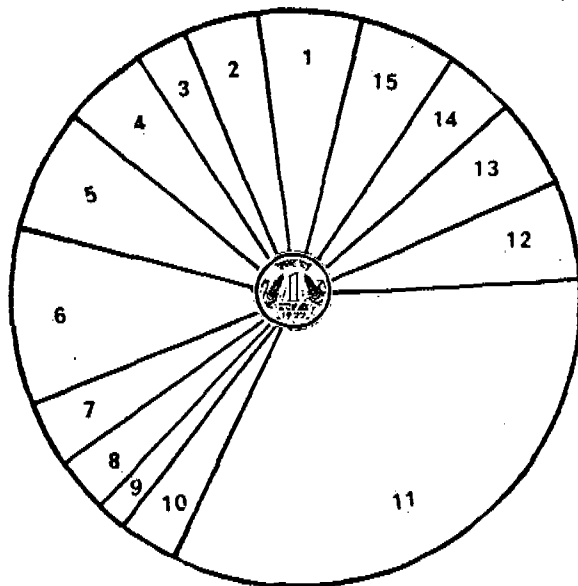
Every year, approximately Rs.50 crores are being spent on various water supply and sanitation schemes by the Kerala Water Authority. The expected expenses in this sector for the year 1988-89 has been calculated as Rs 44.85 crores. Out of this Rs 40.43 crores has been allocated for Urban schemes and only Rs 4.43 crores for rural water supply. Sanitation facilities (drainage) have been allotted Rs 1.75 crores, Rs.29.67 crores has been allocated for operation and maintenance. Out of this, Rs.13.21 crores is spent as salaries and wages and Rs.16.46 crores has been allocated for miscellaneous expenses.

One must be wondering where all this money comes from! The government, each year in its budget allocates a fixed amount for the activities of Kerala Water Authority. There are loans from institutions like LIC and the World Bank. The money spent through Socio-Economic Units by Dutch and Danish governments and money collected as water charges from consumers also keeps the KWA going.

Annexe

Let us see how the amount allotted for water supply and sanitation has been divided for each item.

1.	Identifying the source of water and preparations.	2.8%
2.	Processing of water.	2.5%
3.	Pumping facilities.	1.5%
4.	Water reservoirs.	3.4%
5.	Distribution network.	18.0%
6.	Transmission pumps for distribution network	14.5%
7.	Repairs and maintenance of roads and approaches.	2.4%
8.	Construction of residences for employees	0.5%
9.	Construction of Office Buildings.	0.1%
10.	Equipment, materials and instruments.	0.5%
11.	Purification facilities	33.0%
12.	Salaries and wages.	9.5%
13.	Allowance for depreciation.	8.0%
14.	Acquisition of land.	0.8%
15.	Miscellaneous expenses	2.5%
	Total	100.0%

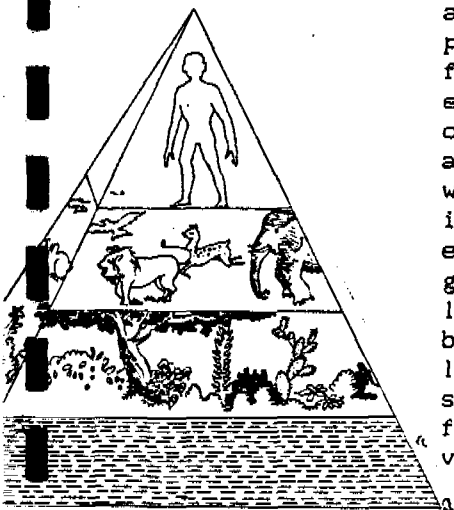


CHAPTER 7

WATER, AN INVALUABLE NATURAL RESOURCE

Manacaud Sukumaran Nair
O. T. Rema devi
Isac John

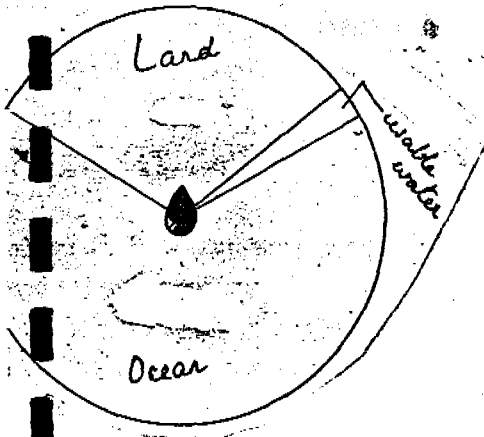
Water, after air, is the most essential element that sustains life. Water is necessary to all living beings to meet almost all of their physical needs. The first traces of life were found in water. Most of today's forms of life are evolutions from life in water. A major proportion of the body of living beings is water. Water is an integral element in the development of cells which is the most basic structure of life. Water is indispensable in the process of digestion, excretion, blood circulation, respiration and growth. We feel thirsty when the water content level in our body goes down. An ordinary human being living in a tropical region requires 2 litres of water every day for drinking alone. In short, water is indispensable to human beings from birth to death at all stages of growth and various activities.



Man is indebted to water for all his progress and achievements. Water is essential also for irrigation and animal husbandry. Water makes earth fertile. Without water, our beautiful earth would turn into a desert. We can not cook food or wash clothes with out water. The culture, religion and progress of human beings are all related to water. Ancient civilisations took shape on river banks. Water is used to run machines, produce electricity and transportation. In fact we have to depend on water for each and every aspect of our life.

SOURCES OF WATER

Earth is rich with water. Oceans, rivers, lakes, ponds etc. are all important sources of water. The atmosphere contains moisture which is tiny drops of water. The rains and mist and snow falls are different forms of water that fall on earth. Water thus recieved by the earth is stored as surface water in rivers and ponds and lakes. Water that seeps into earth is waht we call the ground water. The store of underground water is what we get from wells. 71% of the earth's surface is water. We have only 29% of land. 3% of this water is in rivers, lakes and ponds. One may feel, 'we have so much of water to keep life surviving for millions of years.' But, sea water



is very salty. Each litre of sea water has 35 gms of salt content. The remaining sources of water amount to very little. Almost 75% of the drinkable water is in ice-form in the polar regions. In short, there is very little water that is left on earth for our use.

WHAT IS PURE WATER?

Water that is not harmful to the functioning of human body its growth and survival may be called pure water. In other words, water that is germ-free, colourless and tasteless is pure water.

DIRTY WATER IS DEADLY

Cholera, Typhoid, Diarrhoea, Polio, Jaundice etc. are some of the dangerous diseases that may lead to death, which are caused by dirty water. Mosquitoes breed on water and they are responsible, to a large extent, for the spread of such water-related diseases.

HOW IS WATER POLLUTED?

Water gets polluted largely because of the irresponsible and careless behaviour of human beings. The main reason for easy water pollution is open-air defecation. Germs that can cause diseases, which come out with human excreta, find their way through to wells and other sources of drinking water. Germs get into drinking water also when people bathe, wash clothes, wash domestic animals in or near drinking water sources. The use of unclean ropes and buckets to fetch water from wells also causes water pollution. Pollution also happens when dirt from drains, latrines, composte yards, grave yards etc. by some way, reaches drinking water sources. Industrial and chemical wastes, throw-aways, waste and garbage from market places, hotels are also reasons for the indiscriminate and deadly pollution caused by man himself. Nuclear radiation is the latest contribution from mankind in making pollution an even worse proposition. Looking at it closely, water is polluted at source, all the way, in many ways.

WATER POLLUTION

It is upto us, water users, to protect water sources from pollution and take care in not wasting or misusing drinking water. Various voluntary organisations, social workers, local selfgovernment bodies and the governments can work together a lot to prevent water pollution.. The message of the drinking water decade is to



reach drinking water to all and to use it carefully without pollution. All the countries and various international organisations like UNICEF, World Bank, etc. are all working together towards a common goal. We have a very long way to go to reach the goal of 'Drinking water for all'. Yet, there are a great many things that we can do to prevent water pollution to a very great extent. No amount of legislation can help stop this tendency. Only consistent public awareness campaigns can find an effective solution to this problem of water pollution. Scientifically developed health education programmes are being implemented extensively.

PREVENTION OF WATER POLLUTION - points for consumers to ponder



1981-1990

WATER DECADE

1. Avoid open air defecation.
2. Keep surroundings of wells and taps clean.
3. Avoid bathing, washing clothes, domestic animals and anal cleansing near wells and taps.
4. Use well water only after making sure that the water is germ free.
5. Make sure that ropes and buckets used to fetch water from the well is clean.
6. Be very careful that fingers, and clothes do not dip in the water taken for drinking.
7. Keep drinking water always covered.
8. Use vessels with long handles, or ladles to take water from containers. It is even better to use a container with a lid and tap facility to take water for drinking.

A FEW SIMPLE TECHNIQUES FOR WATER PURIFICATION.

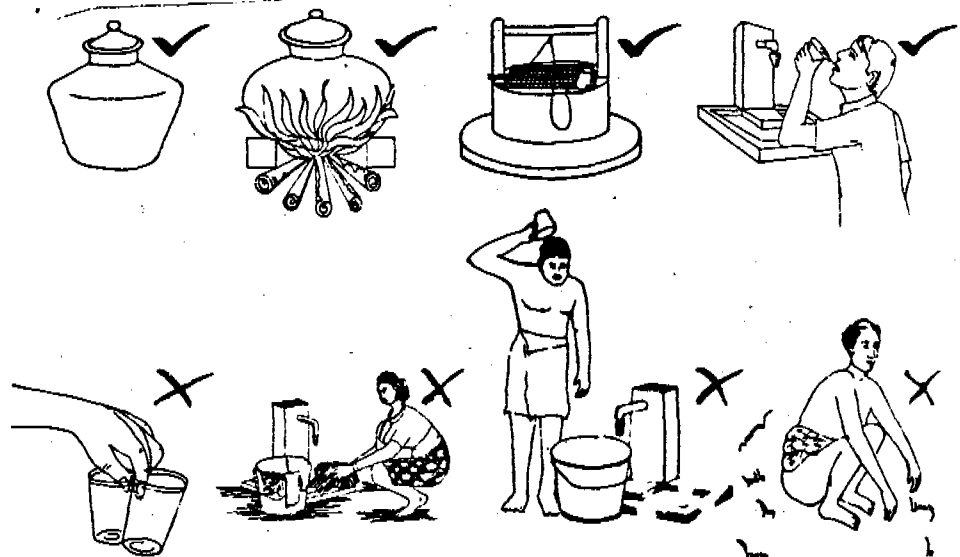
1. Boiling - Use drinking water only after having boiled it for 5 to 10 minutes.
2. Bleaching Powder - Use well water only an hour after mixing it with bleaching powder in a 1 ltr:0.5mg ratio.
3. Chlorine tablets - Available freely in almost all health centres. The simplest and easiest technique to purify water collected and stored for drinking purposes. A tablet of 0.5gm is sufficient to purify about 20 litres of water.

PURE WATER IS A SCARCE WEALTH. DO NOT MISUSE IT

It is every one's duty to see that water is not wasted or misused. 'Let us not waste a drop of water, Let's not waste the precious water' should be our slogan. Purified piped water should be used only for drinking and domestic purposes. Let us keep in mind that if we are careless about water now, in the future we may have to depend on dirty water for everything.

Now that man has discovered that surface water is fast depleting, he has set his eyes on ground water. Even this treasure of pure water is being indiscriminately used. The increase in population has created an increase in demand for water. However, the quantity of water available through different water sources has not increased. This is the most serious crisis that we are facing now.

Unpredictable changes in climatic conditions cause shortfalls in timing and quantity of rainfall. Indiscriminate deforestation deprives the opportunity for surface water to stay there. As long as water is not allowed to enter subsurface levels, the time when there will be no ground water is not too far away. Soon water may become a rare property. Let us work together to create a feeling that 'water is precious life'.



CHAPTER 8

HEALTH ASPECTS OF WATER

O. T. Remadevi

The ultimate goal of the rural water supply schemes going on in Kerala is to contribute to a healthy population. This, in turn, provides the basis to develop creativity and upgrade our lifestyles. This is not something that can be achieved in just two or three days. It requires continued efforts and education. It requires dedicated service from social workers and health educators.

Most of mankind's health habits are related to water and water to many diseases. Water-related diseases are of two kinds: water borne diseases, and, those due to shortage of water.

WATER BORNE DISEASES

Cholera, Typhoid, Polio, Jaundice, Diarrhoea etc. are few of the water borne diseases. Germs causing these diseases reach water through human excreta. People who consume such water contract these diseases. The safest way to prevent such happenings is to use water carefully. Let us now examine some characteristics of these water borne diseases.

Polio

This is a disease to be very careful about, as far as Kerala is concerned. This is usually found in children. This disease spreads very fast during summer and at the beginning of the monsoon.

This disease is caused by Polio viruses. These germs enter the human body through water and food. It gets into water when people who have already contracted this disease defecate in open air. People living in very unhygienic conditions are more prone to this disease. This disease affects the brain, nervous system and muscles. Sustained fever and fatigue in parts of the body are symptoms of this disease. The possibility of permanent physical handicap is very high. Living in hygienic conditions and careful handling of water can prevent this disease.

Jaundice

This disease is caused by a kind of virus. Germs that come out through human excreta get into water. Using this water for drinking or cooking purpose causes this disease. Fever, the presence of yellow color in urine and skin, etc



are symptoms of this disease. Avoiding use of polluted water is the best way of preventing this disease. It is also important to protect drinking water.

Typhoid

This is one of the deadliest water borne diseases. An unremitting fever for a very long duration is the main symptom. Typhoid causing viruses have the capacity to resist very high and very low temperature. Even after the course of the disease, germs do not completely get eliminated from the human body. One third of those who have been victims of Typhoid are carriers of this disease. These germs keep coming out through human excreta. If these germs get into drinking water, this can be a means to spread the disease.

DIARRHOEAL DISEASES

Unhygienic living conditions and consumption of polluted water are causes for these diseases. Germs responsible for these diseases enter water through human excreta. Besides it can also enter human body through dirty fingers, clothes, utensils etc. It has been estimated that almost 15 lakhs children lose their lives every year from diarrhoeal diseases.

Dysentery

Excessive vomiting, and loose motion causes dysentery which weakens the patient very soon.

Cholera

A very highly communicable disease, it starts with loose motion; incessant vomiting and defecation weakens the patient. This disease is capable of causing death to the patient.

Diarrhoea

Unusually excessive defecation with blood stains and phlegm in the stools are symptoms of this disease. It causes dehydration and thirst and is capable of causing death to patients.

Oral Rehydration Therapy

If patients of diarrhoeal diseases are given timely care it could even save them from death. Oral Rehydration Therapy (ORT) as it is generally known, is some thing that can be practiced even at home.

ORT is done with a solution (ORS) made from one cup of water mixed with a spoon of sugar and a pinch of salt. The water used for this purpose should be boiled and cooled. Besides, salted rice gruel, tender coconut water, a very light black



tea etc are some other common drinks that can be used as Oral Rehydration Solution. A powder to make ORS is freely available at all government dispensaries and Primary Health Centres.

Precautionary Measures

Use drinking water carefully. Protect water from pollution. Make the use of latrines a habit. Take food when it is warm and fresh. Do not take food that is left open or uncovered. Such practices can prevent water related diseases to a great extent.

DISEASES DUE TO WATER SCARCITY

Not using sufficient water can also cause diseases. Boils, Trachoma, bacillary dysentery etc are diseases caused by not using sufficient water. The following unhygienic reasons could cause diseases due to insufficient use of clean water

- Not keeping our body clean by washing
- Not keeping towels, dresses and bed sheets clean
- Not keeping vessels and containers used to take food, clean.
- Not washing hands clean with soap after anal cleansing.

Boils

Need no description. One of the most repulsive health conditions, which is very common. It is possible to keep off this disease by just keeping our body clean.

Trachoma

A virus-caused, conjunctive eye disease. Makes eyes sore. Capable of causing permanent blindness. Almost 5% of the total or partial blindness cases found in India are caused by Trachoma. There are approximately 34 lakhs of totally blind and almost 450 lakhs of partially blind people all over India. This disease causes grave concern to the society as a whole because it affects education and hampers creativity.

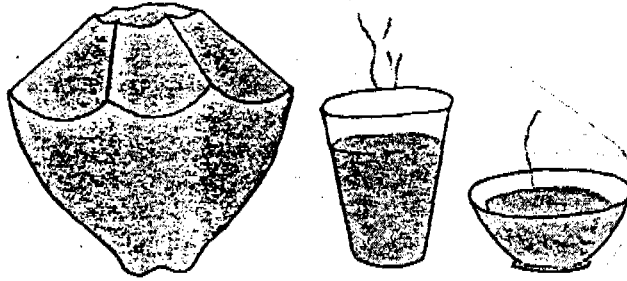
Symptoms

Red coloured eyes, fluid exudation from eyes with or without pus, swollen eyes, pain when facing light, faint vision, often leading to blindness.

This disease spreads when water becomes scarce, and at the beginning of monsoon, when house flies become very common. Clothes used by trachoma patients when coming into contact with other people also cause spreading of this disease.

PREVENTIVE MEASURES

Keep your body and eyes clean every day by using sufficiently clean water. Health is a personal wealth. To maintain good health is each one's own responsibility. Let us work together to build a healthy nation.



CHAPTER 9

WATER SUPPLY SCHEMES AND ITS MAINTENANCE

*Jaju Jacob**Padmanabhan Nair*

1. The basis of the success of any programme is scientific design, operation and maintenance. The quantum of benefit derived by a consumer from water supply is based on the scientific design, and its efficient operation and maintenance.

2. The Government works with a goal to provide water supply to everyone as quickly as possible. Water supply systems suitable to the peculiarities of Kerala can be classified into two:

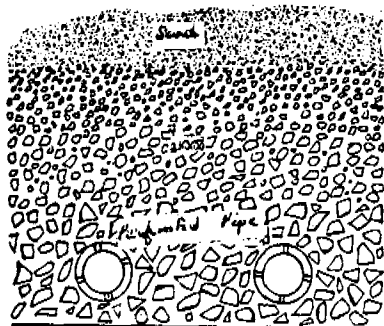
- a) Water supply schemes tapping ground water, and
- b) Water supply schemes using surface water.

GROUND WATER WATER SUPPLY SCHEMES

Ground water for water supply is collected in two ways.

1. Through Infiltration Galleries
2. Through wells.

GROUND WATER COLLECTION THROUGH INFILTRATION GALLERIES



Tunnels (which are huge pipes with perforations) are laid in sub-soil layers in such a way that water alone is tapped. The slopes of these tunnels (pipes) are used to collect water at a convenient location from which it is pumped to the surface level. It is then distributed to water supply systems. A gallery or a chain of galleries may be constructed to collect ground water. The water thus collected is clean and pure because it passes through sand and gravel during its journey. However tests are conducted to examine the quality of the water and purify further if required, before distribution.

GROUND WATER COLLECTION THROUGH WELLS

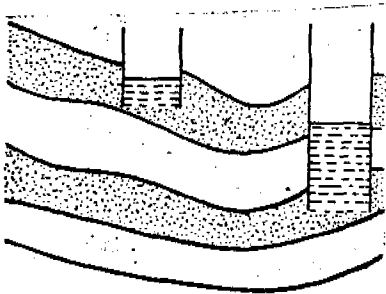
Rain water seeps through the earth and stops at a layer of soil which does not let water seep through any further. The layers which allow seepage of water are porous layers and those which do not are impervious layers. While digging wells, water is struck when digging reaches the impervious layer.

WELLS AND BORE WELLS

Depending on the method of construction, wells can be classified as ordinary wells and bore wells. Ordinary wells can further be classified as Deep Wells and Shallow wells, depending on depth of the impervious layer at which water is struck.

SHALLOW WELL

While digging wells, if water is struck at the first impervious layer, this well is called a shallow well. Water found in this layer may contain dirt. Therefore water from such wells requires purification. Most wells found in our country are shallow wells.

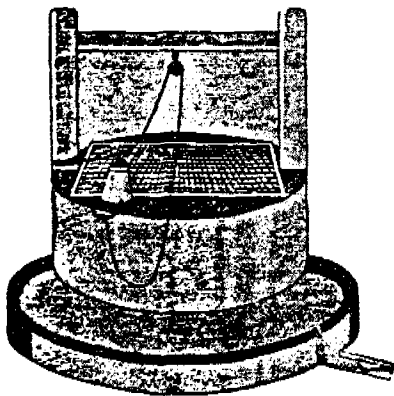


DEEP WELL

Rain water which seeps through layers of soil sometimes reaches upto the second or the third impervious layer. Therefore, water struck at the second or deeper layers is called Deep well water and such wells, Deep wells.

MEASURES TO PROTECT WELL WATER.

1. Wells should be dug at least 15 metres away from latrines, stables, compost yards etc. If Wells are to be dug in slopy terrain, they should be dug at higher levels.
2. There should be a wall around the well.
3. Build a platform around the well and make drainage provisions for runoff water.
4. Use only one set of rope and bucket to collect water from the well.
5. It is safe and better to lift well water by using pumps.
6. Do not bathe, wash domestic animals, or clothes near a well.
7. It is good to have a protective net cover for wells.
8. Plaster the interior of the well upto at least 20 feet from the surface.
9. Chlorinate wells at regular intervals.



Special care should be taken to keep the surroundings of pump, tap and gallery always clean.

Depending on the depth of the surface of water level and the number of people who fetch water from the well, the choice between pump and a set of rope and bucket is left to the convenience of the consumers. Pumps can be of two types: hand pumps and electric pumps.

The operation and maintenance of hand operated pumps are simple and easy.

Electric pumps are operated with the help of an electric motor and their maintenance is relatively complex.

Maintenance of pumps can be classified into three.

1. Simple maintenance that can be performed by a trained consumer.
2. Repairs that require services of a trained mechanic, and
3. Repairs to be undertaken by an expert.

WATER SUPPLY USING SURFACE WATER

Sources of surface water are rivers, lakes, ponds and streams. Water from such sources can be used in two ways.

1. Collect water by building galleries at the source of the surface water, purify and supply.
2. Reach surface water to a purification plant and supply. Urban water supply schemes mostly follow this method of collection, purification and distribution.

PURIFICATION PROCESS OF WATER.

If water has iron content, it is subjected to a process called Aeration.

The next step is Sedimentation. Large and insoluble particles are left in a tank for a specified duration of time and then dissolved. Then less dense particles in the water are treated with a mixture of Alum and Calcium and left for Sedimentation.

Water is then filtered by passing water through a filter of sand and gravel.

The bottom of the Sedimentation plant has to be cleared occasionally and the filter cleared of dirt.

Pumps may have to be used as required by the situations.

PURIFICATION

Water collected from wells and filtered should be subjected to purification or chlorination. The amount of Chlorine that is to be used for purification can be determined through experiments.

CHARACTERISTICS OF CLEAN WATER FOR DOMESTIC PURPOSES.

Standards of Physical and Chemical contents

Sl.No	Characteristics	Acceptable limit
1.	Impurity	2.5
2.	Colour	5.0
3.	Taste and odour	Nil
4.	Solvent minerals (ppm)	-500
5.	Hardness (ppm)	-200
6.	Chlorides (ppm)	-200
7.	Sulphates (ppm)	-200
8.	Flourides (ppm)	-1
9.	Nitrates (ppm)	-45
10.	Calcium (ppm)	-75
11.	Magnesium (ppm)	-30
12.	Iron (ppm)	-0.1
13.	Manganese (ppm)	-0.05
14.	Copper (ppm)	-0.05
15.	Zinc (ppm)	-5.00
16.	Phenol (ppm)	-0.001

Standards of Poisonous contents

1.	Arsenic (ppm)	0.05
2.	Cadmium (ppm)	0.01
3.	Chromium (ppm)	0.05
4.	Cyanide (ppm)	0.05
5.	Carium (ppm)	0.1
6.	Selenium (ppm)	0.01
7.	Mercury (ppm)	0.001

STANDARDS OF RADIATION

Total Alpha radiation (Picocurie/ltr) 3
Total Beta radiation (Picocurie/ltr) 30

STANDARDS OF BACTERIAL STANDARDS

1. In a sample of 100 ml, there should be no E-Coli bacteria.
2. In a sample of 100 ml, there should be not more than 3 Coliform bacteria
3. No Coliform bacteria in two consecutive samples of 100 ml.

STANDARDS OF VIRUS

Ensure presence of a residue 0.5 in areas suspected of presence of virus, and 0.2 in areas which are free from virus. 0.5 portion of chlorine in a million portions of polluted water is capable of destroying all viruses.

Quality controlled water after purification processes is distributed through water supply systems.

SUBJECT WELLS AND PIPES TO DECONTAMINATION

New and renovated wells should be decontaminated by chlorination. Chlorine which 40 to 50 portions in a million is used for this.

DUG WELLS

Remove all the left over materials used for construction of the well and chlorinate the well using 50 parts in a million Chlorine for purification of the well water for use. Continue pumping of water from the well until water becomes absolutely clear. Once the well is full with clean water, chlorinate the well once again and then wait for 24 hours. This process can be carried once again if additional purification is felt as necessary.

PURIFYING USED WELLS

Assess the quantity of water in the well. The following formula is used for this purpose.

$$3.14 \times d^2 \times h = 1000 \text{ ltrs}$$

4

HOW TO MIX WELL WATER WITH BLEACHING POWDER

Depending on the quantity of the the water in the well, take bleaching powder in a bucket, mix it with some water to make a paste. Add three quarter portion of water to be mixed with this paste, stir the solution for some time, wait until the solution is completely sedimented. Tie this bucket full of bleaching powder solution down to the level of the surface of the well water. It takes 30 minutes for the water to react with the water in the well. After this the well water is safe for drinking and other domestic uses.

BORE WELLS

Pump out the well water completely with a test pump, until the water in the well becomes clear. Remove testing equipment and then chlorinate the well water as is done for other ordinary wells. Water from Bore wells are usable 24 hours after chlorination or purification.



PIPES

New and renovated pipes need to be purified/decontaminated before using water from this source. Use 10 parts in a million chlorine for chlorination of pipes. Water supply can start 24 hours after the purification of pipes. Confirm level of presence of Chlorine in pipewater to acceptable limits before starting water supply through pipes. Excessive Chlorination can also cause health problems.

QUALITY CONTROL

The water used for drinking has to be tested quite frequently. This has to be carried out at least once a week. Quality of water can be ascertained by testing samples regularly at the Public Health Laboratories or the Water Analyst's Laboratory.

CHAPTER 10

WATER SUPPLY - VARIOUS SYSTEMS.

George Varghese

Water that we get from different sources cannot be directly used. It may contain a lot more dirt than we think. Water is supplied only after determining the quantity of dirt and taking enough measures to purify the water meant for mass consumption. This chapter deals with a few common water supply systems.

HAND PUMP

Water that we get from wells and hand pumps is relatively clean compared to water from other water supply systems because well and pump water are ground water.

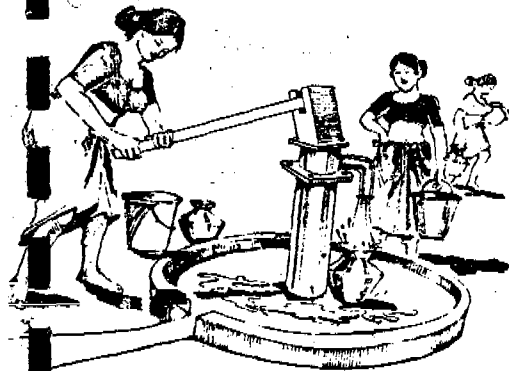
Hand pumps are of different kinds. Rural hand pumps are the main source of water to the rural population in our country. A G I Pipe fitted with a strainer fixed at the bottom reaches the surface of ground water. This pipe when fitted with a pump is the basis of a hand pump. When a handle is fitted water can be lifted and collected.

We have to be careful to keep water from the hand pump clean. The pump should be on a platform made of cement. There should be a drain for excess water run-off. Do not let waste water or garbage gather upto 10 metres around the hand pump. Before fixing the pump, water in the well should be scientifically chlorinated. Keep the well and surroundings always clean.

Depending upon the quality of the ground water, nature of soil and the quality of the strainer at the bottom of the pipe, the life of a hand pump can stretch to 10 years. Replacing the strainer will add to the life of the hand pump.

DEEP BORE WELLS.

Ground water available at a very deep level underground is tapped through deep bore wells. The digging of such wells is done with the help of machines. This is a relatively expensive system. Water supply systems that use water lifted to surface using electric pumps have also been implemented. This system uses a piped distribution network. Since water is made available from ground water sources, this can be a permanent source of water. The variations in



rain water do not really affect this system of water supply.

PUBLIC STANDPOSTS

Public standposts are built with a view to provide safe water to people below the poverty line. Public standposts are fixed at places where there are at least twenty households with no other source of water supply. One standpost should benefit atleast 200 people. Public standposts are fixed at places where water is least available.

Water reaches public standposts after a number of purification processes. It is indeed a blessing to get costly clean water for no cost at all. We must be extremely careful to not misuse water thus available. This water should not be used for any other purpose than drinking, cooking and bathing. Public standpost should be treated as their own by each beneficiary.

Just because one does not pay for water made available through public standposts, one must not conclude that one gets it for free. The local self government bodies pay for such benefits. The local self government bodies pay every year, for water recieved through each tap amount ranging from Rs.1000/- to 1500/-. A panchayat having approximately 100 taps pays to KWA something like Rs 1 lakh to Rs 1.5 lakhs in this respect. This fact reminds us why we should not misuse water from standposts.



COMMUNITY TAPS

In effect, Community taps are also public taps. But these taps are meant to benefit the low-income group more than those who live in the below poverty line group. One portion of the cost of water consumed is paid by the consumers themselves. Each Community tap will have 3 to 10 families as beneficiaries. Remember that it was mentioned earlier that a Public Standpost should be used by at least 20 households. Community taps are fixed in places where the possibility of fixing public standposts are ruled out because 20 households do not exist in that area. Anybody who needs can take water from a public standpost. But only those who have applied for and have been permitted to collect water from community taps can benefit from these taps. This is because they are the ones who ultimately have to pay for the water taken from these taps.

A tap that is supposed to meet the requirements of say, 10 households calls for a per household expense of Rs.7.50 per year which means Rs.75 from 10 households for one year for one tap. To avail benefits of a Community tap, there are set procedures and norms. The 10 households which apply for a tap connection should make the request in one application. This application should include a signed undertaking which agrees to the conditions of benefitting from a community tap. The tap will be fixed in a common place acceptable and convenient to all beneficiaries. A Tap Committee consisting of representatives from each household is established. The supervisor of the committee is responsible for collecting and remitting water charges pertaining to the Community Tap. The Community tap committee is authorised to take action against defaulters of the conditions agreed upon in the original application.

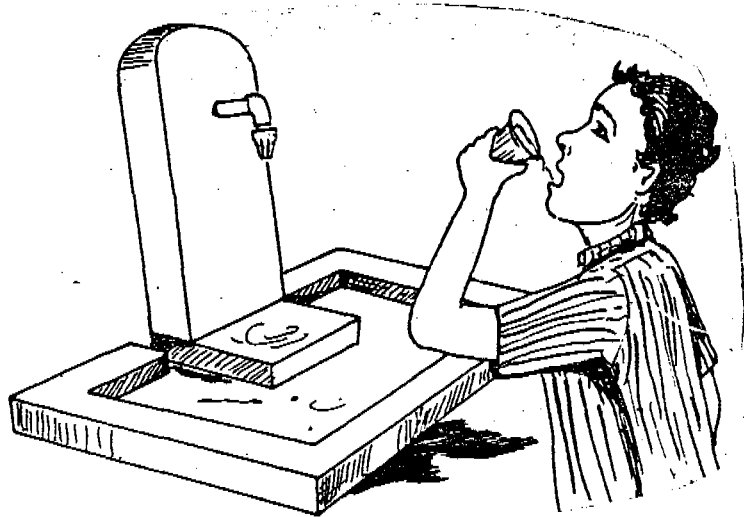
HOUSEHOLD TAPS

The high and middle income groups of people have been identified as those having no difficulty in paying for water that they consume. Therefore it is not fair that they make use of water meant to serve the needs of low income and poor people's groups. It is always better that those who can afford make use of private household connections. The procedure for obtaining private tap connections is to go to the nearest KWA office, apply for a private connection. If there is an existing pipeline running by the applicant's residence, his connection can be provided without much delay. Once we have the permission to avail of a private connection, we can make use of a licenced plumber to fix up pipelines and connections within the house. It may cost upto say, Rs.2000/- to get a private tap connection. This includes Rs. 500/- as service charges and Rs.300/- which will be the cost of the water meter. Meter box, valves, pies etc., will be additional. The cost increases as the number of pipes and its length increases. Once we have a private connection, it is easy to find out the consumption with the help of the water meter. The consumer will have to pay water charges according to the consumption of water.. The rates of water charges need not be the same in all places.

We should always keep in mind that water is a commodity for which we pay money. Water from private connections should also be used for domestic purposes only. Piped water is costly. Since water is the basic element of life, every

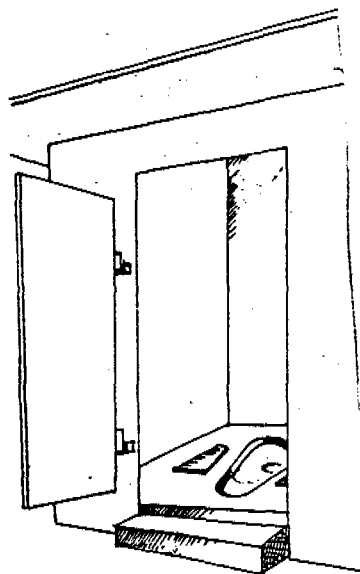


drop of water counts. To conserve drinking water, is every citizen's duty.



CHAPTER 11

SANITARY LATRINES

R. Suresh

Kerala is the most densely populated state in India. Keralites have been using more and more water for their day-to-day activities. Waste water and garbage disposed by people living in densely populated areas causes water pollution.

Human excreta contains plenty of disease-causing germs and hence it is something to be handled with utmost care. This means that human excreta must be disposed in such a way that the germs that come with it do not cause any harm to the health of human beings. Latrine is one such facility which ensures hygiene. Each family should have a safe latrine.

The increasing population creates shortage of space. Nature has been losing its ability to dispose of waste through its usual processes because of the load on the system. Our surroundings are being polluted more and more day by day. If things continue at this rate, there may be a time when our children will have no place to play or grow up in. Kerala is famous the world over for its natural beauty. We may have to hang our heads in shame if open air defecation continues, and if in the year 2000, people start asking "What happened to Kerala"?

Let us, in this chapter think about an appropriate latrine design, suitable for Kerala.

SELECTING A LATRINE

Latrines are of different types. Each one is free to decide upon the most suitable type according to his financial and environmental background. It is important to see that our requirements meet the following conditions when selecting the type of latrine that we want.

1. It is effective and meets requirements.
2. It should be acceptable to the beneficiary and it does not offend one's beliefs and traditions.
3. The construction should make use of local expertise and raw materials.
4. Should be an efficient system.
5. Construction should be simple.
6. Construction cost should be low.

Models acceptable to some people may not be acceptable to some others. Generally speaking, it is not very difficult to explain and make Keralites understand the need for latrines. Any innovation is acceptable to people as long as it does not offend their present living style. Keralites are not averse to the idea of making use of latrines a habit, since they all agree that cleanliness should be part of daily life. Finance is the most difficult aspect of this programme. There are many on-going sanitation projects in Kerala. The success of these projects can be guaranteed only if there is sufficient People's participation and the required funds. At this juncture it is necessary to think of a design that can put to use the many locally available low-cost raw materials and labour. This will make the latrine affordable by the people.

Various technical aspects affect the efficiency of latrines. The nature of soil is one of the important ones. While constructing latrines on loose soil, pits should be lined with laterite or such other materials. Leaching characteristics of the soil is also equally important. These aspects have been causing a lot of problems during construction of latrines in many places. Coastal areas have soil which has better leaching capacity but the soil is too loose to keep a pit in shape. Hill areas have very tight soil where very little or no leaching takes place.

The high water level in low terrains of Kerala is another problem that has to be faced while constructing latrines. It is virtually impossible to make latrines where the water level is not more than one metre below surface. Loose soil not only poses problems to the strength of the the pit but also creates problems of pollution to drinking water sources close by.

Space shortage in Kerala is yet another problem faced during latrine construction. The high density of population further reduces the space available for latrine construction. Closely constructed latrines can cause pollution to the wells existing nearby. It is virtually impossible to construct low-cost latrines in places where the population per acre of land is more than 120. There should be a minimum of 16 sq.ft. (4.5 x 3.5) for a single pit latrine. A twin-pit latrine requires a minimum of 40 sq.ft. (9 x 4.5).

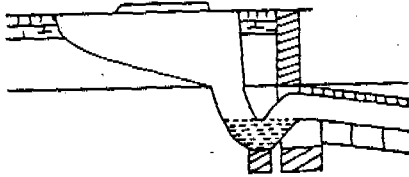
It is assumed that Kerala has sufficient water for use in latrines. In places where water scarcity is a possibility, changes in the design

have to be made.

There are certain important points that we, as beneficiaries of the scientifically constructed latrines, have to remember all the time. No sanitation programme can succeed unless proper maintenance is carried out. Therefore local self government bodies and the beneficiaries have to be trained in the operation and maintenance of sanitary latrines. This means that the success of a sanitation programme does not rest only with the successful technical execution of the construction of such latrines. Beneficiaries have to be trained in the operation and maintenance of sanitary latrines, keeping in view, their demands and traditions.

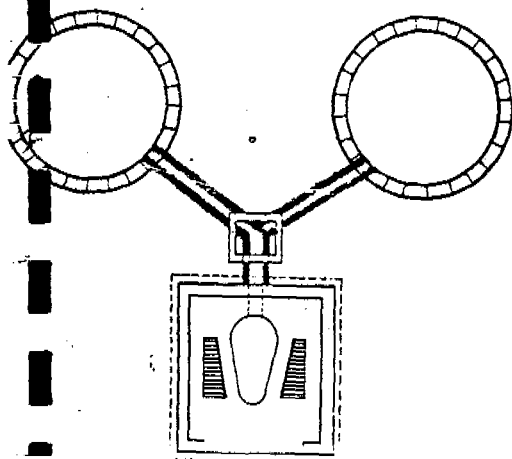
SANITARY LATRINES FOR RURAL KERALA

Urban areas have a latrine which has a cistern to flush away disposed excreta. This is very expensive and requires plenty of water. Therefore it is suitable only to places where there is a water supply system. There is another type of latrine which requires relatively little water and can be flushed by pouring water into the pan. What is common to these two types of latrines is that both systems have water seals. Water seal is the most important part of the latrine because this prevents foul order and germs from entering the bowl from the pit. Water seal separates the pan from the pit. Pour-flush latrines are also of two types. Single pit and twin-pit.



Pan and water seal can be fixed above the pit which, once full, needs to be covered with lime. In the meantime another pit may be used until the contents of the first pit are completely chemically degraded. After some time the contents of this pit turns into harmless fertilisers which can be taken out for suitable purposes.

The twin-pit latrine, on the other hand, uses the two pits alternately. The 'Y'-shaped junction box built between the pan and the pits is a very important part of this type of latrine. The twin pit latrine is a permanent system. There are two kinds of processes going on inside the pit. The water and the water content of excreta inside the pit leaches into the surrounding soil and the germs are also killed by natural process. The amount of excreta is reduced largely and the gaseous contents evolved in the process are also absorbed by the soil around.



Despite the numerous advantages of the pour-flush latrines, it also has some disadvantages. The drain pipe could be blocked by any large material that might fall into the pan. This has to be made clear to the beneficiaries. The construction cost of these latrines can be very high in places where the ground water level is high. Small plot-owners also have a potential health related problem. Waste-water from latrines can pollute drinking water sources nearby. Only well thought-out designs, designed by experts can help overcome all these problems.

