WATER SECURITYPLAN FOR KALPAKANCHERY

MILES
Moopen Institute for Local Empowerment

Water Security Plan for Kalpakanchery Panchayath
2013

Moopen Institute for Local Empowerment

"Water is the driving force in nature."

Leonardo Da Vinci

Contents

Page

List of Tables

List of Figures

Moopen Institute for Local Empowerment

MILES, Moopen institute for local empowerment initiated and funded by **Padmasri Dr. Azad Moopen** in three years span of time has become an integral part of the kalpakanchery panchayath addressing the needs of the general populace with specific interventional programmes . Women, students and Youth are the main focus of interventions.

The programmes are all need based and participatory in nature. A thorough monitoring and evaluation methods is in place to assess the impact of each programmes. The whole panchayath is divided into a 152 clusters with each cluster having an average of 40 houses. Programmes at the grass root level are organised and carried out by the men and women volunteers of the clusters

In an attempt to tackle the acute water shortage of the village, MILES devised a Rainwater harvesting system in consultation with the Kerala Regional Chapter of Central Ground water Board(CGWB) and Centre for Water Resources Development and Management (CWRDM). The devise has proved to be very effective and organisations from all over the state is taking it up as a model for water conservation.

MILES wants to build a model village at Kalpakanchery and reach out to other villages of India.

Preface

The aim of this report is to chart out a feasible plan to avail sufficient and clean water to every households and public institutions of Kalapakanchery gram panchayath of Malappuram district, Kerala throughout the year. The report take a comprehensive stock of the water situation of the gram Panchayath by mapping both the private and Public water resources of the area, household water requirements, institutional water requirements and public water distribution initiatives of the panchayath. The report also deals with a detail analysis of the water availability in one of the wards of the Gram Panchayat.

The importance of water in the world, today, can be witnessed by the mere fact that the year 2013 has been declared as 'International Year for Water Cooperation'. Availability of safe and clean water is a major cause of concern with every passing year. India with 16% of the world's population has only 4% of the fresh water resources. Per capita availability of fresh water in India has dropped from 5,177 cubic meters in 1951 to 1,820 cubic meters in 2001.The need of the hour is to find better and feasible ways to manage water sources and develop water conservation habits in the people and sensitize them to keep safe and clean water for coming generations. Better management of water resources is directly linked with sustainable and safe living standard. The magnitude of the water scarcity problem can be very well anticipated through the fact that water and sanitation crisis claims more lives through diseases than any war claims through guns.

This report is timed to contribute to the existing efforts of water conservation and management in the area. By highlighting some key issues related with water scarcity in the area, we hope to contribute to existing efforts and measures being taken, pertaining to water scarcity in Kalpakanchery Panchayath. We also hope that this report will be a model for all the other villages of India to chart out “Water security plan” of their own. Mr. A. Pratheek, Student of M.A Development Studies, Azim Premji University was with our organisation for a six week internship. We owe a great deal to him for the immense contribution to this project. Even after his internship period, he has helped us in structuring the report.

We are extremely thankful to Dr Nandukumar, regional director of Central ground water board for helping us to tackle the complexities of the Project. Thanks to Mr Ashraf.V.M, Shafeeque Gazzali, Suneer N.N and Melepeediyakkal Abdul Muneer for spending their time and effort.

Irfan Habeeb

Executive Director,

Moopen Institute for Local Empowerment

Executive Summary

The objective of the study is mainly to map the water sources of the panchayath, assess the demand, supply and shortage of water both at household and institutional level and to chart out a water security plan for the panchayath. A meticulously planned questionnaire was designed after due deliberations with expert bodies to extract information on these specifics.

Public water resources which include public ponds, public wells and streams have been subjected to thorough examination. 18 educational Institutions were also objectively analysed for their water requirement and availability. To get an in depth feel of the household requirement pattern, 296 households of ward 16 of the panchayath were surveyed. The recent public water distribution initiatives by the panchayath are also reviewed.

The analysis of the compiled data shows that the panchayath is slowly treading into what could be called as a "critical stage" in water availability. The reach of public water supply system is very minimal. The rainwater harvesting system is yet to take off. Forty five percent of the households face water shortage and fifty six percentages says the available water is not adequate.

The situation in institutions that is mainly educational establishments is alarming. Sixty one percentage of institutions struggle to manage their water requirements. The uneven distribution of water sources regardless of the strength of students in the institutions is also glaring. An institution having strength of 474 students have 8 water sources whereas another institution having strength of 3746 has only three water sources. Rain water harvesting structures in institutions is conspicuously absent.

Public open wells and public bore wells of the panchayath have an interesting story to tell. Out of the total 19 open wells only 7 is functioning and 12 are abandoned. Out of the total 73 bore wells only 25 is functional and 48 is abandoned.

The innumerable ponds and the 3 major streams in the panchayath offer great potential for future water conservation efforts. The ponds are huge reservoirs of water and the streams which meander through nearly half the geographical area of the panchayath offers immense scope for water conservation.

The recent initiatives of the panchayath in the public water distribution efforts through mini public water projects will be more effective if it is done through expert consultation and technical assistance from the external agencies working in these domains.

List of abbreviations

NRDWP	National Rural Drinking Water Project
CGWB	Central Ground Water board
BCM	Billion Cubic Meters
Mbgl	Meters below ground level
CWC	Central Water Commission
GP	Gram Panchayath
WHO	World Health organisation
APL	Above Poverty line
BPL	Below poverty line
RWH	Rain water Harvesting
PRA	Participatory Rural Appraisal
NGO	Non Government organisation
CSO	Community social organisations
amsl	Above mean sea level
PRI	Panchayath Raj Institutions
NWDPRA	National Watershed Development Programme for Rain Areas

Relevance of the Study

The rainfall experienced by Kalpakancherry Gram Panchayat and the water scarcity is a paradox. The scarcity exists even while there is an abundance of private and public ponds in the panchayth. This is precisely the area of our investigation. The issue is one to be the lack of scientific water management. Households are forced to source water from far off places even at the start of January. The price for water thus sourced is Rs 600 for 1500 litres in a week. Institutions mainly educational institutions accommodate a very Institutions mainly educational institutions accommodate a very significant number of populations of the panchayath. The students with staff of these institutions combined make up population strength of 9025. As these sizeable numbers of people spend a considerable time of the weekdays here, it has become imperative to take a close look at these establishments. Public water resources mainly ponds, streams and public wells are also thoroughly examined. The report in a nutshell attempts to go deep into the water situation of the panchayath in its entirety and proposes suggestions to improve it

Objectives of the study

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1. Make available sufficient and clean water to each and every household and institutions of Kalapakanchery gram panchayath throughout the year.
2. Mapping the water sources of the panchayath.
3. Present usage of water and shortage.
4. To chart out a comprehensive " Water security plan for Kalpakanchery gram panchayath" based on the collected data
5. To position the study report as a model and motivate other organisations and institutions to come up with a "water security plan of their respective geographical areas.

Data Sources and Methodology

The report relies both on primary and secondary data with major share of primary data. The report draws several analyses from data collected from primary source and supports them through secondary citations. The questionnaire was designed in tune with the one made by the government of India for National Rural Drinking Water Project (NRDWP).

12 field investigators were engaged for data collection. The details of the area investigated are as follows.

Table : 1 Households, Institutions and Public resources

S.No.	Area Investigated	Units
1	Ward 16, Households	296
2	Institutions	18
3	Public Water Resources	102

Table : 2 Public water resources

S.No.	Area Investigated	Units
1	Bore vells	73
2	Open Wells	19
3	Ponds	7
4	Streams	3

Limitations of the Study

The study carried out is subject to the following broad limitations:

(1) Time was a big constraint. The time of data collection was during monsoons, so data collection was a challenging one.

(2) The household water requirement survey had to be narrowed down to a single ward in the Gram Panchayat. Had there been enough resources, the study would have covered whole 5018 households of the panchayath.

(3) There are innumerable private ponds in the panchayath. These ponds were left out from the purview of the study.

(4) For working out the upstream abstractions for various uses, assumptions had to be made depending upon the type of data that could be obtained for the abstractions. Uniform procedure could not naturally be adopted for all the areas.

Structure of the Report

The report is divided into five chapters. The first chapter deals with the condition of water availability and scarcity in a global perspective followed by the status of water demand and supply scenario in India, Kerala and Malappuram. This section also focuses in general the scene in kalpakanchery panchayath.

The second chapter deals with the demand for water in the ward 16 and extensively investigates the requirement of the households, usage pattern and complete details of type of water sources, the people have access to.

The third chapter deals with the institutional water requirement in the Gram Panchayath. The section brings forward the picture of water availability, requirement and scarcity in the public and private institutions of Gram Panchayath. The primary aim behind such an analysis was to assess the requirement and availability in these institutions and distribution of water sources among these Institutions. This was done because institutions form a significant part of water budget in an area.

The fourth chapter deals with Public water resources of the panchayath. Public open wells, Public bore wells, Ponds and streams are examined for their utility and functionality. This chapter also review the previous water conservation efforts under government schemes and recent initiatives of the local authority in public water distribution system.

The fifth chapter charts out a water security plan based on the findings above.. The plan charts out possible ways and solution to increase water conservation in the area and prepare the households and institutions to face drought like conditions in summer.

Chapter 1
Water Crisis – An Over view

Water – A Global perspective

1.1 Water is Life

Wherever they are, people need water to survive. Not only is the humanbody contains 60 percent water, the resource is also essential for producing food, clothing, and computers, moving our waste stream, and keeping us and the environment healthy.

Freshwater makes up a very small fraction of all water on the planet. While nearly 70 percent of the world is covered by water. 97% of the total water available on earth is saline. Only 3% of water available on earth constitutes fresh water. Out of this, just 1% of our fresh water is easily accessible in lakes, rivers and streams and 77% is trapped in glaciers and snowfields. The rest of water is available as ground water. In practice, only .007 percent of the planet's water is available to fuel and feed its 6.8 billion people.

Due to geological and hydrogeoligical setup, climate, engineering, regulation, and competition for resources, some regions seem relatively flush with freshwater, while others face drought and debilitating pollution. In much of the developing world, clean water is either hard to come by or a commodity that requires laborious work or significant currency to obtain.

According to the United Nations, water use has grown at more than twice the rate of population increase in the last century. By 2025, an estimated 1.8 billion people will live in areas plagued by water scarcity, with two-thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change (National Geographic, April, 2010) Of all known species, 7 to 12 per cent are heavily dependent on fresh water, and around 30 per cent of them are endangered, a far higher proportion than for other habitats.

According to United Nations Children's Fund (UNICEF) that almost 90% of child mortality is by diarrhoeal diseases which are directly linked to contaminated water, lack of sanitation, or inadequate hygiene. (UNICEF Press meet, New York, Mar 22, 2013). Human behaviour has altered the planet's climate and chemistry, its snow cover, permafrost, sea and glacial ice extent, and ocean volume: all fundamental elements of the hydrological cycle. Water needs to be considered not in isolation but as part of a water-energy-food – health nexus, in which each sector affects, and is affected by, the others.

1.2 Indian Scenario

India has more than 17 percent of the world's population, but has only 4% of world's renewable water resources with 2.6% of world's land area. Ground water, which is 38.5% of the available water resources of the country, plays a major role in the irrigation, rural water supply and even in meeting industrial and drinking water needs. Ground water is an open access property and the situation now is any one can extract without any limits.

The average annual rainfall in the country is 1170 mm, which corresponds to annual precipitation, including snowfall of 4000 billion cubic meters (BCM). Out of this volume of precipitation, only 1869 BCM appears as average annual potential flow in rivers. Due to various constraints, only 1123 BCM is assessed as the average annual utilisable water – 690 BCM from surface water and 433 BCM from ground water. The present total water use is 634 BCM of which 83% is for irrigation Although India has made improvements over the past decades to both the availability and quality of drinking water systems, its large population has stressed planned water resources and rural areas are left out. In addition, rapid growth in India's urban areas has stretched government solutions, which have been compromised by over-privatization. Regardless of improvements to drinking water, many other water sources are contaminated with both bio and chemical pollutants, and over 21% of the country's diseases are water-related. Furthermore, only 33% of the country has access to traditional sanitation.

The country is divided into 5,723 geographic blocks. More than 1.000 is considered either over exploited, meaning more water is drawn on average than is replenished by rain, or critical, meaning they are dangerously close to it. Twenty years ago, according to the central ground water board, only 250 blocks fell into these categories. (TIME,

1.3 Kerala - Scarcity in the midst of plenty

Kerala is one of the smallest states in India covering only 1.3 per cent of the total area of the country. The state accounts for 1.18 percent of India's land area, but it has about 4.8 percent of the country's water resources. However, the population density of the state, 819 per square kilometre is much higher than the national average of 364 per sq. Km as per 2011 census. Among the states, Kerala has conventionally placed as 'water safe' economy. In spite of heavy annual rainfall, high 'well density' and numerous rivers and ponds, the state of Kerala is paradoxically situated among the country's lowest per capita ground water availing state. Among the states, Kerala has conventionally placed as 'water safe' economy.

The climate of the state is typically tropical with seasonally excessive rainfall and hot summer. The state of Kerala is situated in the humid tropics with two prominent rainy seasons of south-west monsoon and north-east monsoon. Over 80 per cent of the annual rainfall is received during the South-West monsoon which sets in by June and extends up to September and the rest from the North-East monsoons during October to December. Kerala is blessed in abundance of rainfall of about 3000 millimetres on an average annually, which is close to three times the national average of 1170 mm. In Malappuram district nearly 74% of rainfall is contributed by south-west monsoon and nearly 16% by north- east monsoon and the rest is as summer showers. Even after getting this heavy rainfall, due to the undulating topography the rainwater find an easy outlet through the rivers to the Arabian Sea. It is observed that Kerala has less freshwater per capita than the desert state of Rajasthan (Sooryamoorthy and Antony (eds.), 2003)

Over 60 percent of the geographical area of the state is covered by laterites and lateritic soil, encouraging little infiltration (Agarwal and Narain 1997). The laterites are highly porous and due to this the aquifers (wells) gets recharged fully by initial few rains itself. Subsequent rains contribute little to the aquifer system and escapes as rejected discharge .Due to this high porosity, stored water escapes as subsurface runoff from the elevated hills and slopes, once the rain recedes. So the state experiences severe summer from January to May when the rainfall is minimum. According to central ground water board annual replenish able Ground water resource is 6.84 BCM. As rainfall is the main source of water availability in the state, any failure in the southwest or northeast monsoon will affect the availability of drinking water, electricity production and agriculture and hence the livelihood of the population. A few numbers of site-specific studies explained the 'scarcity in the midst of plenty' due to several reasons such as high rain water runoff, loss of forest cover, sand mining, reclamation of paddy fields, etc. (State Planning Board 2002; James 2003; Bhattathirippad 2003; Mathai 2003; Sooryamoorthy and Antony 2003).

1.4 Malappuram

The district has a geographical area of 3550 sq.km, which is 9.13 % of the total area of the Kerala. According to 2011 census, the district has a population of 4110956 which is about 12.31 % of the total population of the State. Of the total population 1961014 are males and
2149942 are females. The district has recorded a population growth rate of 13.39 % during the decade 2001-2011, which is the highest in the State.

Rainfall

The district has more or less the same climatic conditions prevalent elsewhere in the state. The normal rainfall of the district is 2793.3 mm. In Malappuram district nearly 74% of rainfall is contributed by south-west monsoon and nearly 16% by north- east monsoon and the rest is as summer showers. Physiographically the district can be divided into three viz. coastal plain (less than 7.5 M, amsl, Above mean sea level) midland (7.5 – 75 m amsl,) and highland (above 75 m amsl,). Soils of Mid/Up lands are lateritic soil. Lateritic soil, is seen all along the midland portion of the district. These are deep to very deep, well drain
gravelly to clay.

Overall the district offers tremendous scope for artificial recharge due to the highly porous and deep lateritic profile, especially at places where the ground water is deep. The dug wells in the lateritic areas of the district goes dry immediately after the monsoon season causing severe drinking water shortage to rural population.

1.5 Kalpakanchery

Kalapkanchery belongs to the midland portion of the Malapuram district. The soil found in the area is mostly lateritic soil. From the month of January, the wells go dry and water is fetched from far of areas in tankers. Rainwater harvesting and water conservation methods are rarely practised. The uneven topography makes the run off rate higher. The public water sources (Ponds, wells, water bodies, streams) remains in a pathetic state because of poor maintenance. The existence of large number of private ponds, paddy fields, and streams presents immense scope for improvement in water management of the panchayath

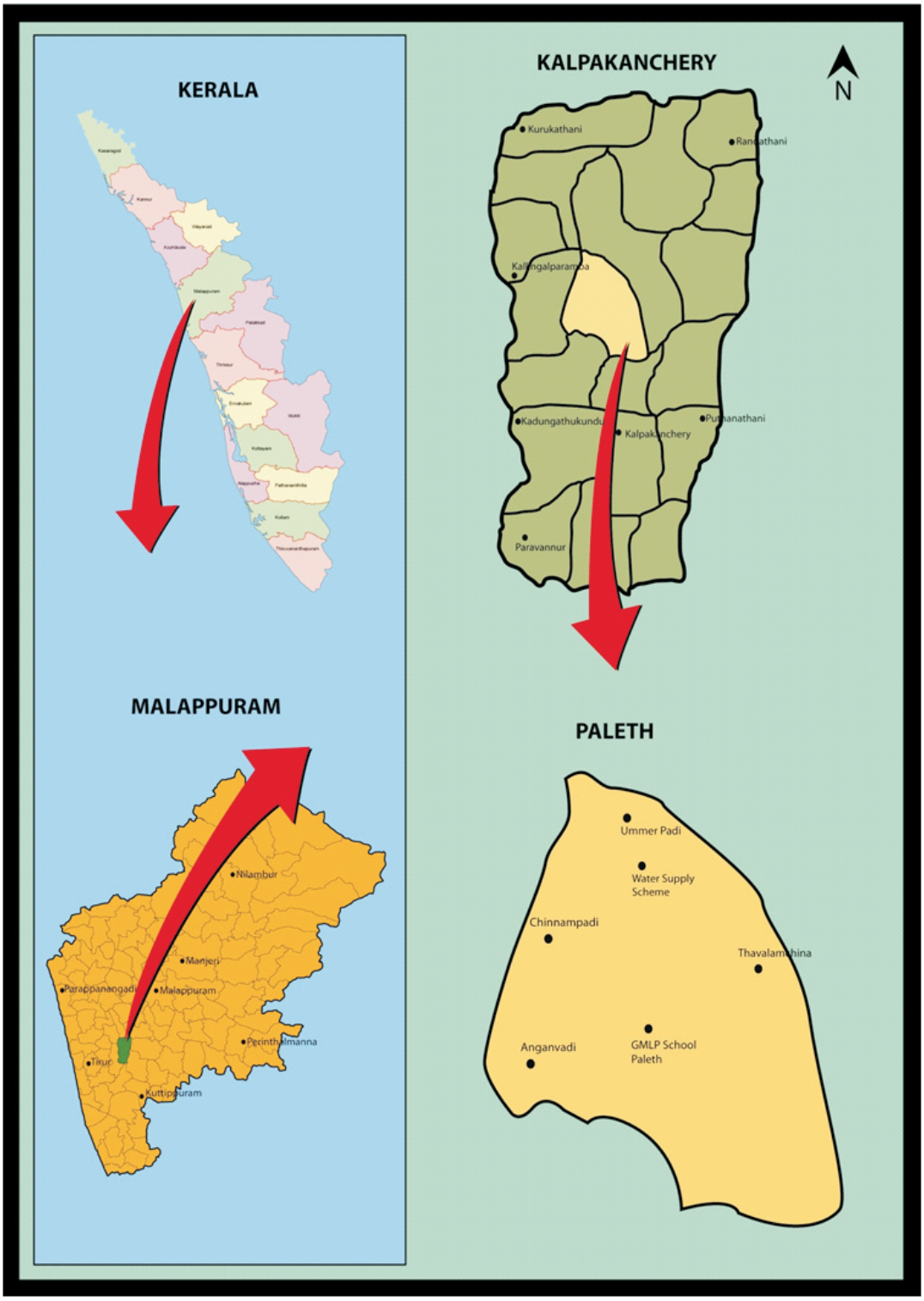
Chapter – 2

Individual Household Survey

Paleth, Ward 16 of Kalpakanchery

Kalpakanchery panchayath is divided into 19 wards. As the topic of our study is "Water security plan for the Kalpakanchery Panchayath", and the main objective of our study is to make available sufficient and clean water to each and every household and institutions of the panchayath throughout the year, it is vital to understand in detail of the water requirements and pattern of usage of water in individual households. As there are 5018 households in total in the whole of panchayath, it was impossible to do a survey in all of the households. So for practical purposes, we have covered 296 households of Paleth, ward 16 of the Panchayath as a sample survey.

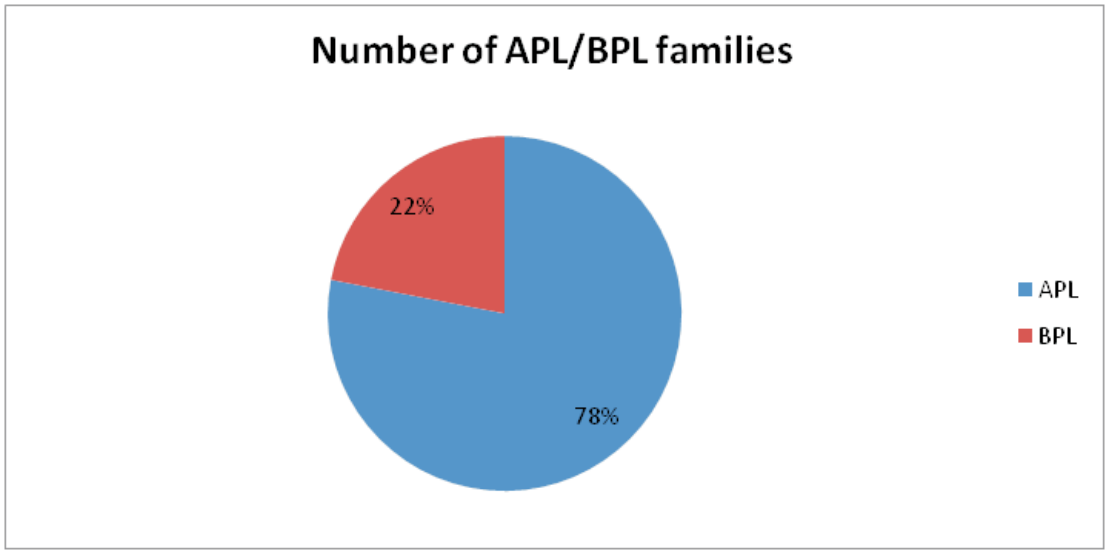
Figure : 1 Kerala, Malappuram, Kalpakanchery Map



2.1 Households and Water sources:

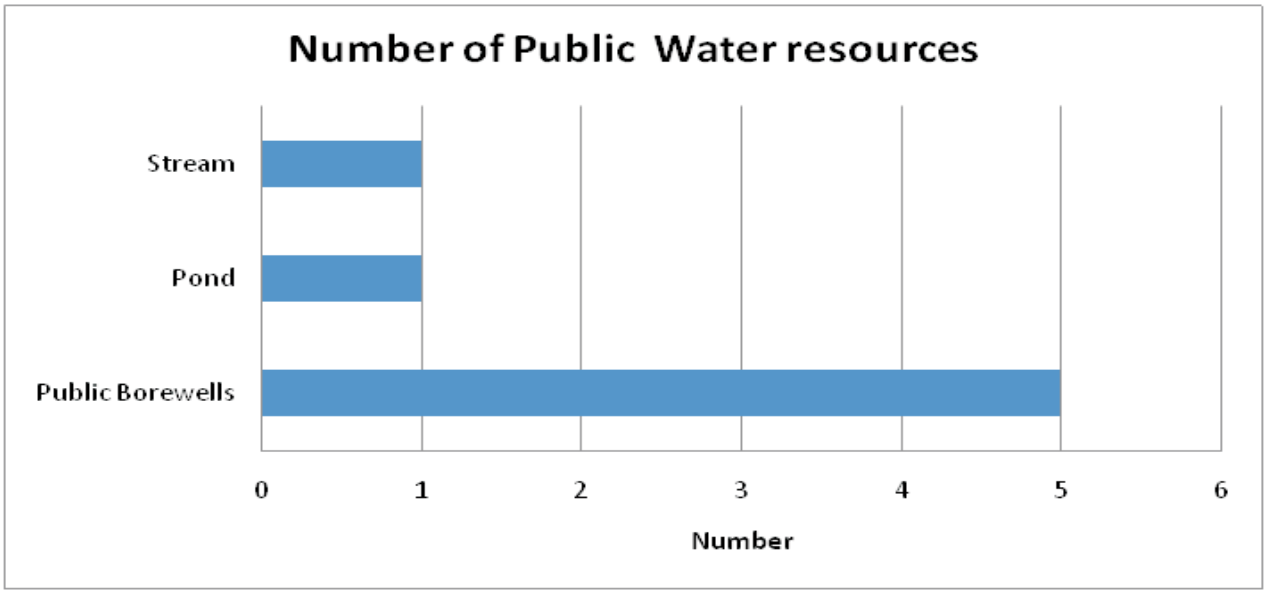
Most of the families of the ward belong to the middle class. Majority of the families in the ward are APL (Above Poverty Line) families.

Figure : 2



Keeping up with their financial status most of the households have private water sources. This implies that most of the families have their own open wells and bore wells.

Figure : 3

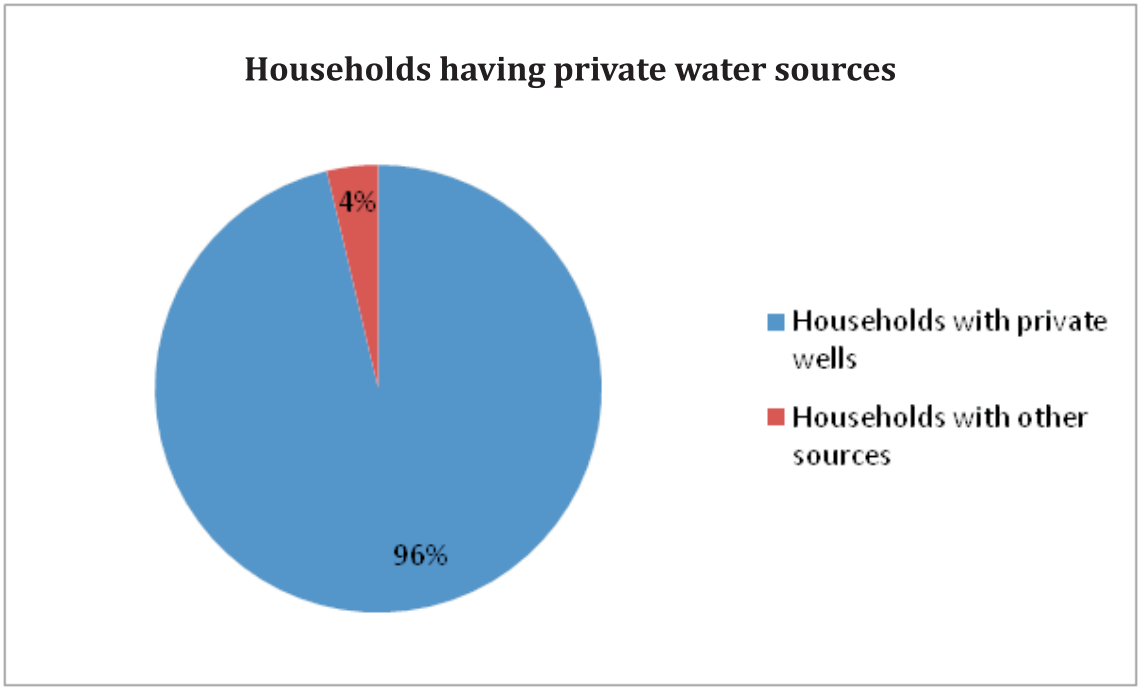


Out of the 5 public bore wells, only one is functional. The pond which is known as Pozhikuthu kulam is a small one which is 10meters in length and 7meters in width. The water is only used for bathing and washing purposes. The water in this pond is available in a usable way only up to October.

The stream which is known as Thotungal Thodu, which runs through the ward is pretty healthy in shape. On an average it is 2meters in width. The panchayath ward member has taken steps to protect the stream by additional re- enforcements of the walls. An interesting fact emerged from the field survey was that the ward member conducts periodic desilting of the stream and the 3 acres near to the only bund in the stream in this ward is used for cultivation of paddy and vegetables .

The graph below (Figure 5) illustrates how many number of households depend on each type of source. It is quite clear from the figure that private sources (open wells& bore wells) dominates the scene in regard to the households and quite interesting fact also emerged from the study indicates that bore wells also shares a significant number as a secondary source for the households. In ward 16, there are 72 private bore wells in all of the 296 households. 24% percent of the households have bore wells.

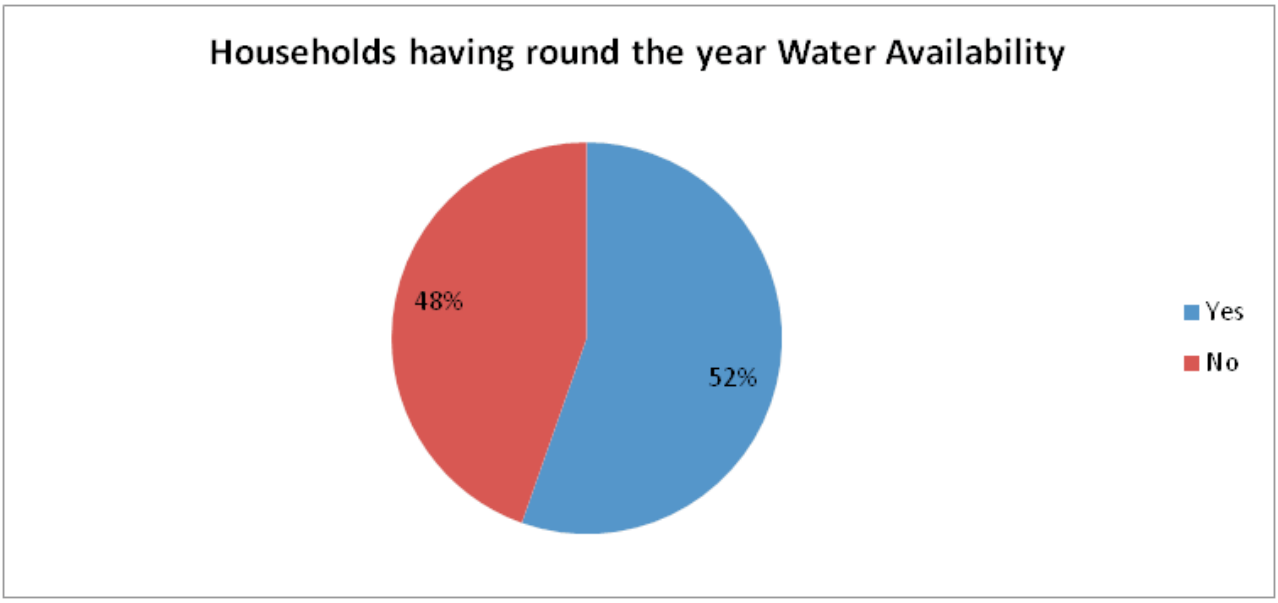
Figure : 4



2.2 Water availability and usage pattern:

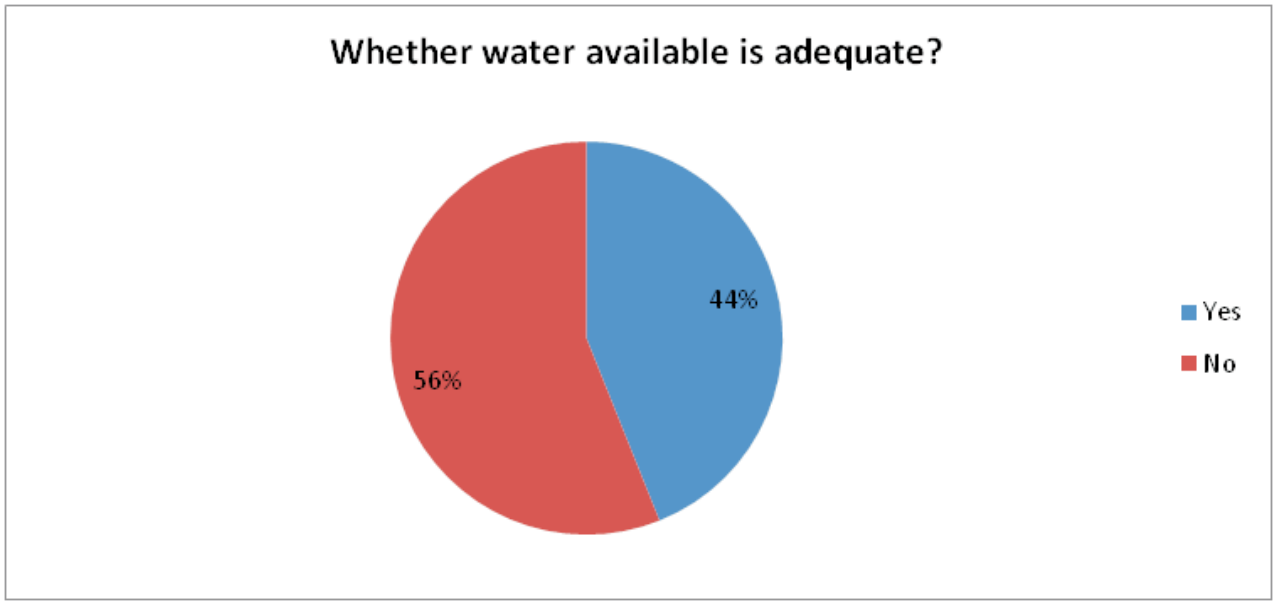
The rainfall experienced in the region indicates that the region is not water scarce. But the data revealed something else. Going by the graph, there is a little difference between those who face scarcity and those who do not. Only 52% of the households have round the year availability. It indicates that the majority inching closer to water scarcity.

Figure : 5



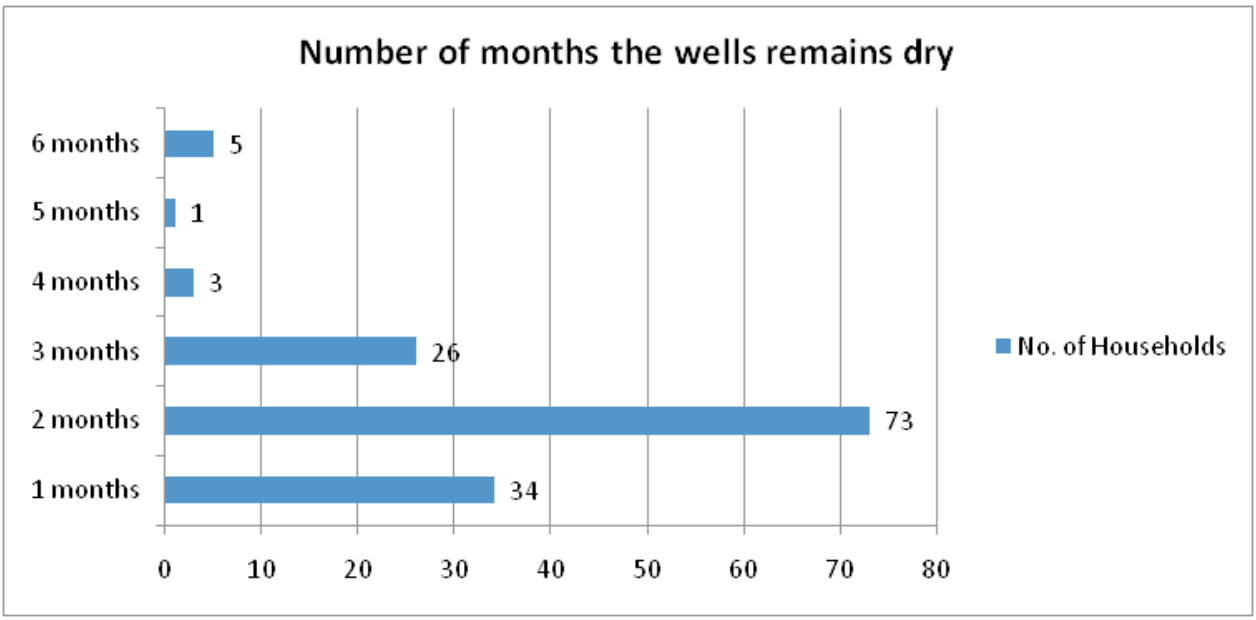
Now the question arises whether availability of water ensures sufficiency of water. The answer makes the above issue more complex. The percentages in the above graph get nearly reversed. 56% households face insufficiency of water. This further analysis tells that even when is round the year availability of water, the available water is not adequate for most of the households. This also opens up the fact that merely stating round the year water stability does not ensure that the region is not water scarce.

Figure : 6



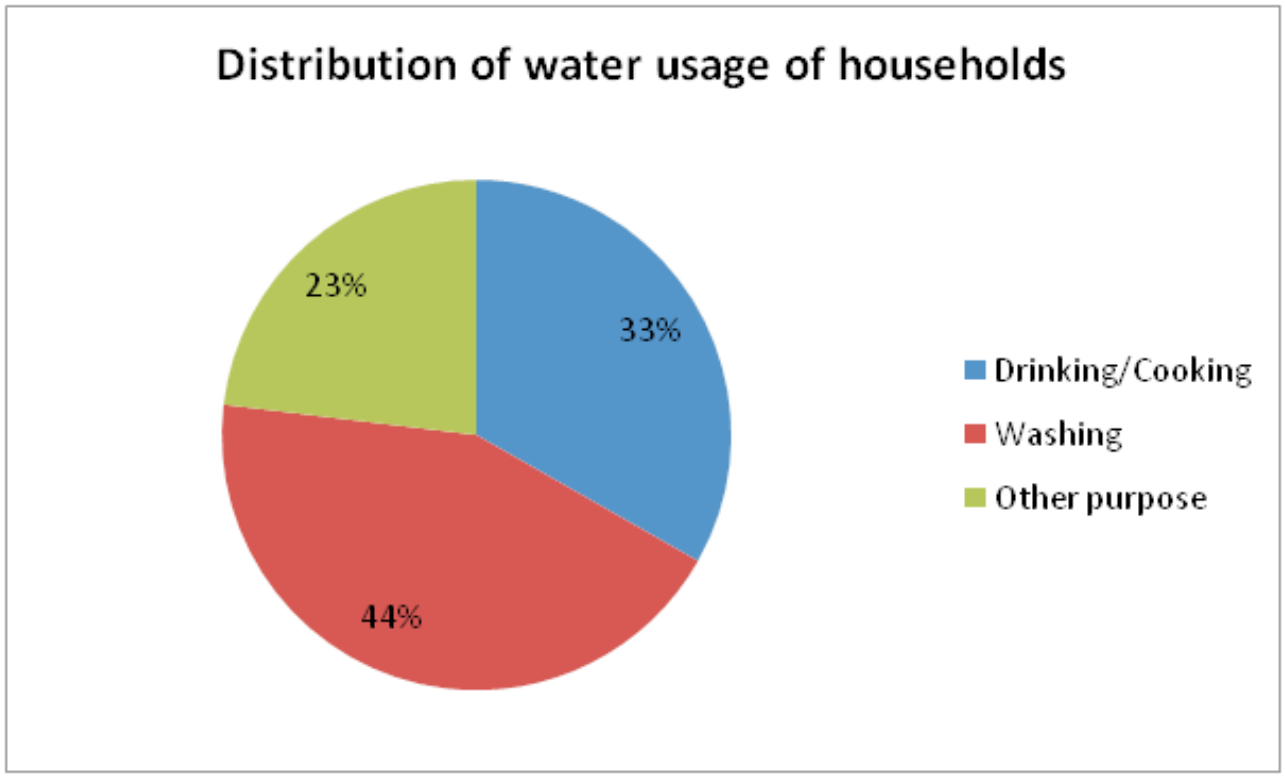
Now the question arises if there is water shortage and if so then how many months the water supply is lesser or how many months the region runs dry. 73 of the 296 households face water shortage for 2 months. But the graph depicts that there are households who witness drought like conditions up to 6 months.

Figure : 7



Coming to usage of water available, the following pattern evolved out of the data. People use water for washing, drinking and other purpose including washing utensils, sanitation, flushing etc. Household consume a considerable large percentage of available water for washing followed by drinking/cooking and other purpose usages. This fact is of great relevance as proper management of washing techniques can result in water conservation and a steep fall in water consumption.

Figure : 8



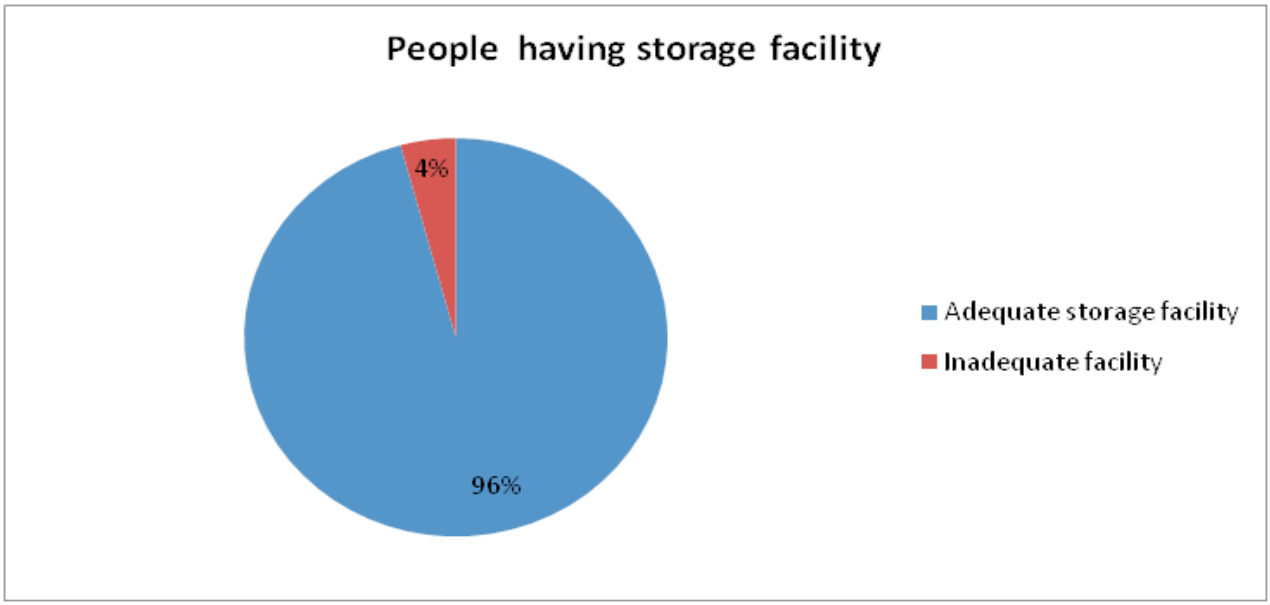
2.3 Public water distribution system:

In the Ummer Padi area of the ward, the worst hit area of the ward, a public water distribution system is in place . The project which is named as "Mini water supply scheme" was made possible using the MLA fund of the former MLA. The total expense have been Rs 2lakhs.. Water is pumped from a bore well and stored in a tank of 1000 liters and distributed to 12 households.

2.4 Storage and conservation facilities:

Sanitation habits and conservation habits include the approach of the people towards having toilets in their houses and having a cleaner and appropriate storage facility. This aspect was

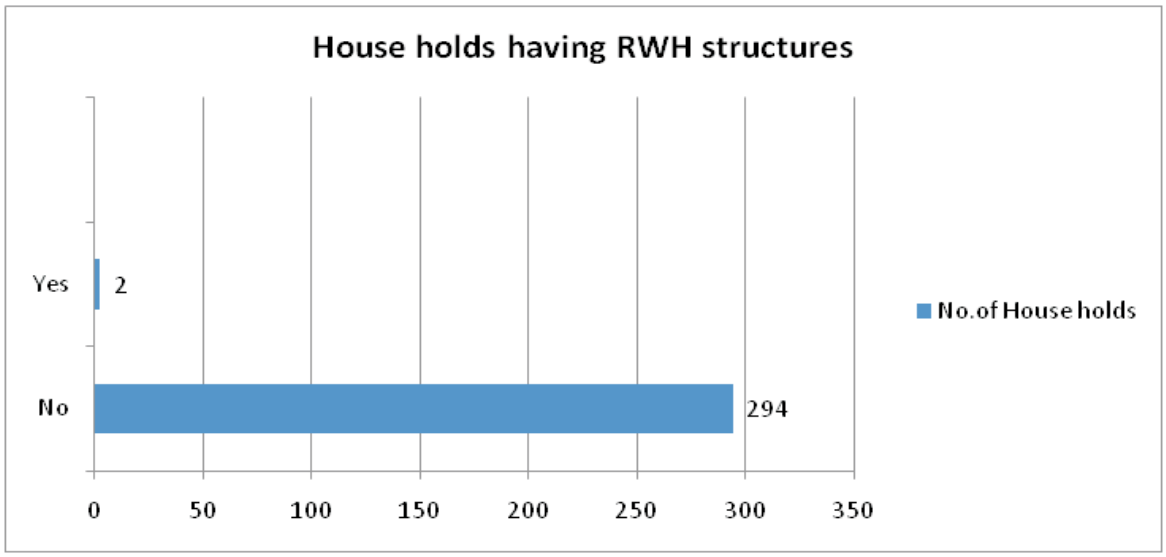
Figure : 9



also covered in the questionnaire in order to assess whether people store water or not. Initial analysis revealed that only 4% people do not have storage facility and rest 96% have storage tanks to keep water for longer use. All the households have their own private toilets.

The next graph adds more spice to this analysis. Even that the households rely more on their own private wells, majority of them and almost all of them except for two houses did not have a rainwater harvesting system. This reveals that despite the dependence on open wells, people do not follow water recharging and conservation practices.

Figure : 10



Chapter 3

Institutional Water Requirement Assessment

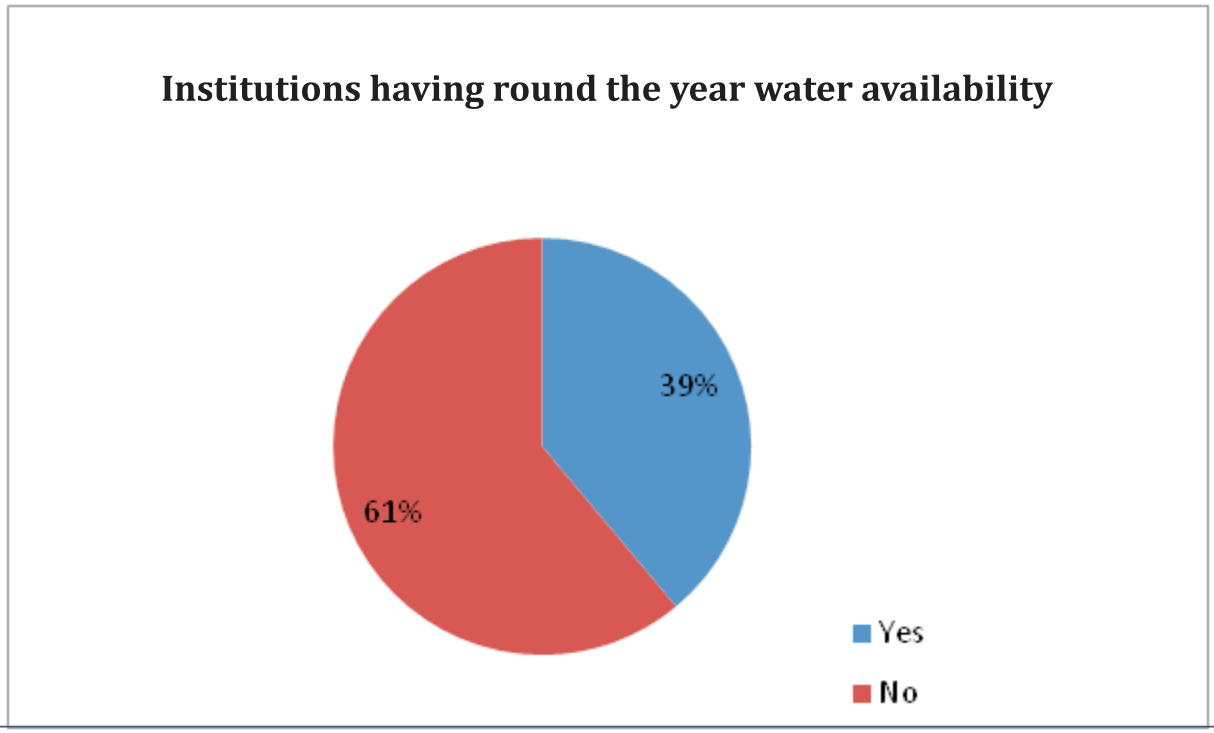
Institutional Water Requirement Assessment

As part of water security plan, an assessment of water required for all the institutions in the area is necessary. Due to time constraints, the focus of the study was kept on educational institutions only. There are 18 major public and private educational institutions in Kalpakanchery. The rationale behind going for educational institutions water requirement survey is that institutions are the place where a majority of people i.e., students spend time throughout the year and these aspect makes the institutions a significant part in water requirement assessment survey. The students with staff of these institutions combined make up a population of 9025. A very sizeable number.

4.1 Institutions and water Availability

Around 61% of the institutions do not have round the year adequate water availability. This implies that 61% institutions face a certain period where they struggle to manage water. Keeping in view the usage of water in institutions is for drinking/cooking, sanitation and washing utensils.. The magnitude of this analysis becomes more following the fact that students spend their considerable time in schools and colleges in a day.

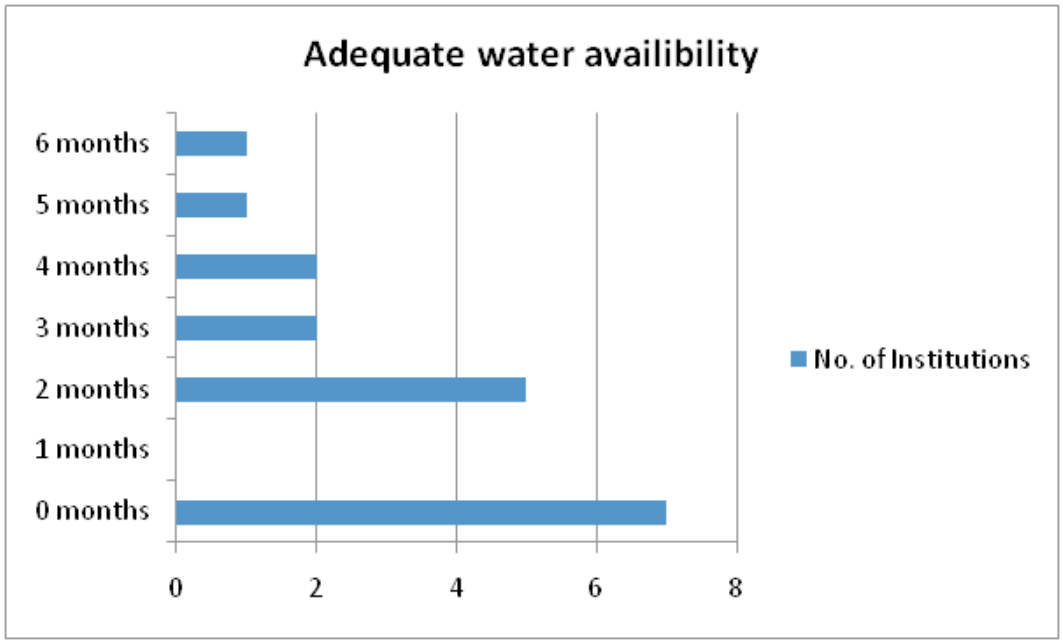
Figure : 11



Also we found that many institutions had more than one water sources such as wells and bore wells. But the question arises if the number of water sources has any relation with round the year water availability. The following table shows the relation between numbers of water resources including wells, bore wells and round the year water availability.

After it is proved that institutions suffer from water scarcity, the question arises how long this water scarcity extends in a year. Similar to household pattern, there are 7 institutions that face water scarcity even half the year.

Figure : 12

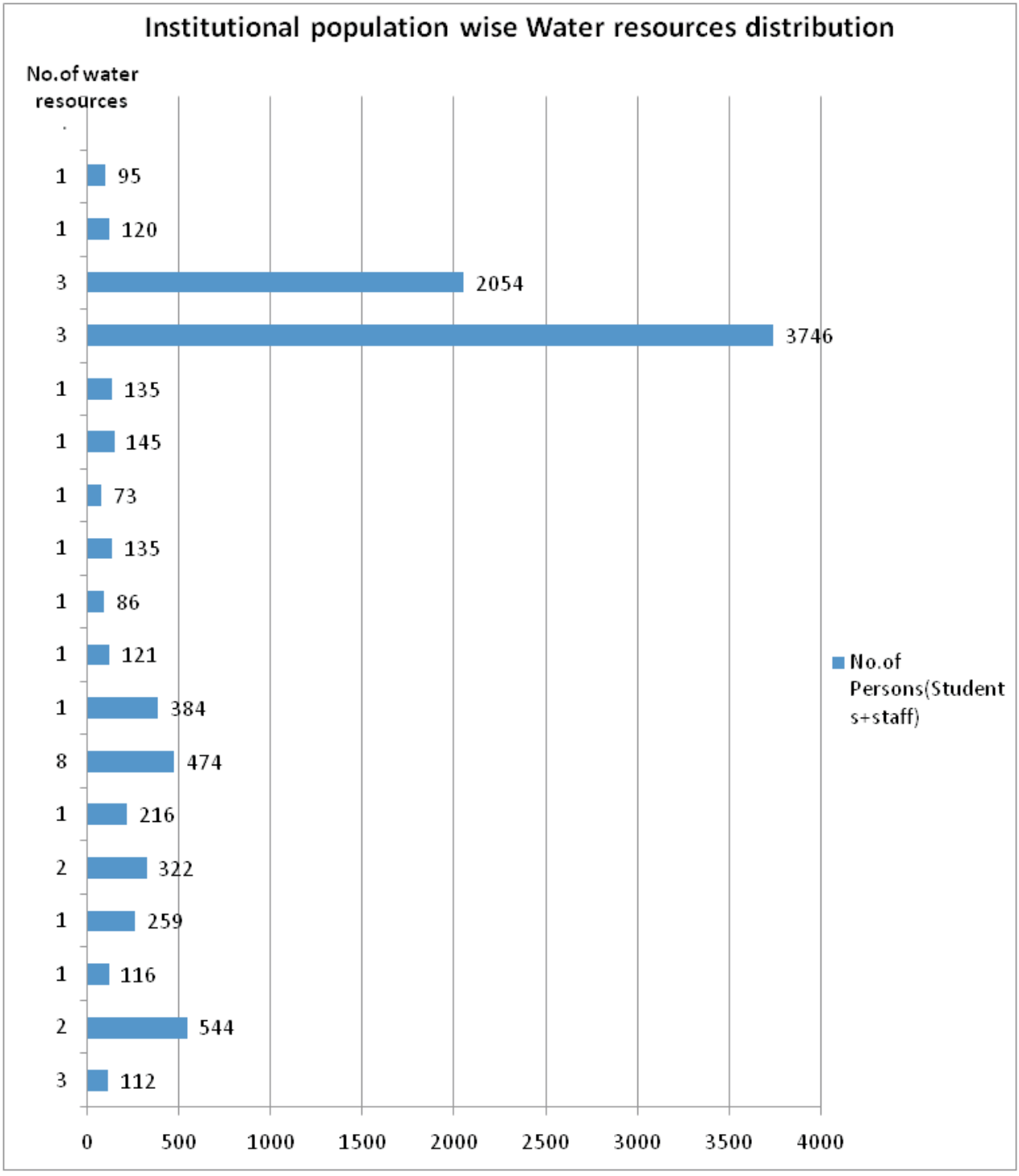


One more surprising fact that came out of the analysis was no institution had the facility of filtering the water. Most of the institutions used to collect water directly from through electric pump and store it in a tank. This indicates towards a crucial issue of quality of drinking water being provided to students studying in these institutions.

4.2 Distribution of water resources in Institutions

What adds more to the problem is the uneven distribution of water sources regardless of population in the institutions. The graph below depicts an institution having strength of 474 have 8 water sources, whereas another institution having strength of 3746 has only three water source. This uneven distribution needs to be taken care of while preparing water security plan.

Figure: 13


Institutional population wise Water resources distribution
No.of water resources
1
1
3
3
1
1
1
1
1
1
1
8
1
2
1
1
2
3
95
120
2054
3746
135
145
73
135
86
121
384
474
216
322
259
116
544
112
0
500
1000
1500
2000
2500
3000
3500
4000
No.of Persons(Students+staff)

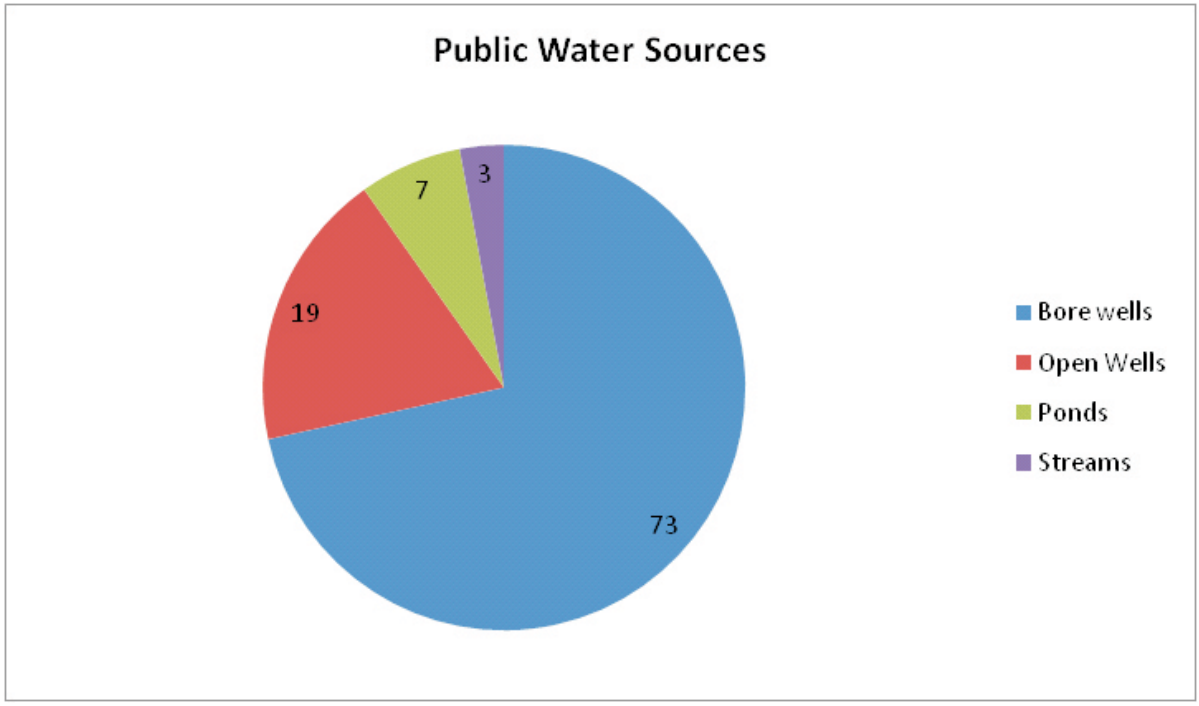
Chapter 4

Public water Resources & Panchayath Initiatives

Public water resources

The Public water resources in the panchayath include 73 public bore wells, 19 open wells, 3 streams and 7major public ponds.

Figure: 14



4.1 Ponds

Once upon a time ponds and streams were an irreplaceable part of the ecosystem of Kerala. Ponds played a significant role in the Kerala village life. They were good water storage areas and water in the ponds were used for agricultural and irrigation purposes. Ponds also increased the ground water level in the neighbouring wells. People of the earlier days, it was a habit for them to take bath in the ponds. As the there was a proliferation of private wells and as the public water supply become common, people of Kerala started to neglect ponds. The periodic desilting of ponds which maintained the storage capacity of the ponds was discontinued and the heavily silted up ponds of nowadays resembled shallow bowls. In Kalpakanchery, the story of the ponds is no different as that from the other part of Kerala.

The periodic desilting of ponds, undertaken by landlords desilting during the pre-land-reform era, was gradually discontinued. Desilting helped to maintain the storage capacity

of the ponds. The silt removed served as fertiliser for the paddy fields as well. With the implementation of land reforms and the division of land into smaller pieces, the responsibility of desilting was shared by the new landowners. And so it did not take place very often. The availability of water through canals also made regular desilting seem unnecessary. Many ponds today are heavily silted up, resembling shallow bowls.

Out of the 7 public ponds in Kalapakanchery, Ayirani chira or Amabalakulam is the biggest of them all. It covers an area of 30 cents .The water level in the wells of the area is maintained by the sheer presence of this big pond. The surplus water in the pond could be used for other parts of the panchayath. The area around the pond is lush green that the place around the pond could be developed as a park.

4.2 Streams

Streams were the life line of the Kerala villages in the past. It went like neural circuits of the body. Streams usually cover long distances and these running water ways played an important role in preserving the biodiversity and vegetation of the area. With the division of the land into small holdings, these streams which run through a long distance had no specific owner and it remained a vulnerable target for encroachments and dumping garbage's. The three major streams of Kalpakanchery panchayath covers half the geographical area of the panchayath. Each stream which varies in length acquires the name of the particular area when it passes through that area.

Manjha chola Thodu or Thottungal Thodu

Manjha chola or Thottungal thodu is the longest of all the three streams of the panchayath. It traverses through almost 5kms of the panchayath. It starts from Chandiri near Puthanathani and passes through Manjhachola masjid, Kunnakad, Thottai, Kunnanchira, Thekinpalam, and Pottengalpadi and finally ends up at Edarikode. There are two bunds constructed on this stream at Manjha chola and the other at Pottengalpadi. The Manjha chola bund is completely out of use as maintenance is not done. Thanks to the ward member of ward 16, the bund at Pottengalpadi is well maintained and periodic desilting is carried out and 3 acres of the land around the bund is used for paddy and vegetable cultivation.

Variyath thodu

Variyath thodu is the second longest stream of the panchayath. It passes through 4kms in length through the panchayath. It originates from Kundaran chira passes through Kundan Pidavu, Chittani, Variyath, and Thaikattupadi and enters the neighbouring Edarikode panchayath.

Paravanoor chola

Paravanoor chola is 2.5 km in length. Paravanoor chola passes through the Padathe peedika and Parvanoor area of of the panchayath. Paravanoor chola is in bad shape in its place of origin near the Paravanoor chola masjid. Concrete wastes dumped is obstructing the smooth flow of water and as the water flows down ,the width of the stream gets narrow down and there is a good chance that if not adequate measures are not taken up to preserve this stream, Paravanoor chola will slowly go into oblivion

4.3 Public open wells & Bore wells

Unlike the age old ponds and streams, public open wells and bore wells are recent additions to the Kerala milieu. Government schemes and grants led to the proliferation of Public wells and bore wells at the panchayath level. The wells served the purpose of catering to its immediate neighbourhood for a certain period. Our study has brought out some startling findings on the public bore wells and open wells of the panchayath.

Table : 3 Public open wells

S. No	Public open wells	Units
1	Functional	7
2	Abandoned	12
3	Total	19

Table 4 : Public bore wells

S. No	Public Bore wells	Units
1	Functional	25
2	Abandoned	48
3	Total	73

63% of the public open wells are abandoned with either many of them transforming as garbage mounds or covered with vegetation. 65% of the bore wells remain abandoned.

4.4 Panchayath Initiatives

Kalpakanchery panchayath has taken various initiatives to tackle the water scarcity problem. In 2012 -13, the panchayath spent Rs 12 lakhs to supply water to the people through tanker Lorries. Panchayath have also initiated "Mini water supply schemes" as a public water distribution system. Many more mini water supply schemes are on the verge of commissioning. Notable among these projects is the "Pathraspadi Kudivella Padhathi" or the "Pathraspadi drinking water project. Eight more mini water supply projects are about to be commissioned.

Pathraspadi drinking water project

Pathraspadi drinking water project is implemented on an expense of Rs 7lakhs. The water from a bore well is pumped to a tank of 5000 litres and drinking water is supplied to households through pipe lines. 38 houses as of now benefits from this scheme.

Kundan kidavu drinking water project

Kundan kidavu drinking water project which have been implemented with a fund of Rs. 4 lakhs with a storage capacity of 5000 litres is in disrepair. This scheme introduced the novel idea of introducing metering of water consumed by each individual household.

Pottepadi Project

Pottepady project near the Panchayath office supply water to 12 households in its neighbourhood.

4.5 Private Initiatives

Anapadikal family which hails from Kalpakanchery panchayath every year supply water to 200 households in drought hit areas of the panchayath on a philanthropic basis.

4.6 Government Funded Schemes

The water conservation and water supply projects of the panchayath were mainly of the fund from either from the panchayath itself or the block panchayath. An exception to this was the Rs one crore fund from the central government under the National Watershed Development Programme for Rainfed Areas (NWDPRA). A major portion of Kalpakanchery panchayath along with a small area of the neighbouring Edarikode panchayath was a beneficiary of this scheme. This project was named "Thottungal water shed project". The project period was from 2002 to 2008.The project was divided again into 5 micro shed projects namely 1. Variyath 2. Cherussola 3.Paravathodu 4.Manjha chola and 5. Amabala Vattom. The project was implemented in three phases. As the entry point activity, the first phase kicked off by cleaning the wells in two LP schools namely, Chirakkal amlp school and Thozhanoor amlp school. Tanks were also built for providing drinking water in these schools.

The second phase of the project was with public works. In this phase, a new pond by name Mavalli paadam Kulam was made. The banks of the major streams were re-inforced with protection walls. Chittani masjid pond was re-built and Low boulder check dams were made along the streams.

The third stage of the project was called the Individual soil conservation phase. Farm conservation, Integral plant nutrition management was implemented at individual households. Fertilisers, organic fertilisers, plantings, seeds, compost mixture was supplied to households.

This scheme has contributed to a great deal in preserving the health of the streams in the panchayath.

Chapter 5

Water Security plan - Findings and Recommendations

Water Security Plan

The ward along with the institutions in the whole Panchayat, as clear from above analysis, clearly indicates that the panchayath is facing severe water scarcity.

5.1 Major Findings

Household Survey Findings, Ward 16.

1. Fifty six percent of the households find it difficult to have sufficient water for their requirement round the year.
2. Thirty percent of the houses finds their wells totally dry in two summer months of April and May
3. Eight percentages of wells in the ward run out of water in six months a year.
4. 96% of the household have private wells and is the main source of water for villagers.
5. Rain water harvesting system in the ward is only in two houses.
6. Only 4% of the households don't have storage facilities like tanks.

Institutional water assessment survey findings

1. There is a population of 9025 (students and staff) in all 18 of the educational institutions of the panchayath.
2. Around 61% of the institutions do not have round the year water availability.
3. The distribution of water resources is grossly uneven. There are 8 water sources in the institute where the total strength of students and staff is 474 whereas there are only three water sources in a institute with a strength of 3746.
4. There is no mechanism to filter drinking water in any of the Institutes
5. Rain water harvesting system is virtually nil

Public Water Resources of the Panchayath Assesment

1. The Paravanoor chola which stretches to approximately 2km in length is becoming extinct due to neglect and dumping
2. 12 of the 19 of the public open wells are abandoned
3. 48 of the 73 of the public bore wells are abandoned
4. Ayirani chira , which is the largest water body in the panchayath needs scientific preservation methods
5. The mini water supply schemes initiated by the panchayath is not sustainable in the long run. As large amount of water is drawn from the bore wells, the water will get exhausted and the water is already appearing to be muddy

5.2 Recommendations - Need for a 3 Tier Approach

The whole situation calls for a better management of resources. The region gets fairly good amount of rainfall. The problem is one of management. The institutions and the households are yet to receptive to installing Rain water harvesting systems. All the initiatives in tackling the problem requires a collaborative approach from other stakeholders i.e., State, Non – government organization, market, communities, water experts and researchers.

This report suggests a 3 tier approach to bring about an impact in the water conservation and sanitation efforts. This approach has 3 levels which need to be interlinked in order to operate effectively.

The Top level approach

It requires efforts from the State including local governments, regional authorities, federal and central agencies. The State should come forward as implementer rather than instructor.

a) The State can partner with civil society organizations and work for raising awareness and building capacity of the community. They both can further work with each other to assess gaps and areas that need to be worked upon.

a) State can work more elaborately on creation of strong norms and strong legislations

b) It can partner or work with communities to devolve power and authority pertaining to water

c) The concept of water metering and charging high end water users can be introduced.

d) Reclaim degenerated water bodies and rejuvenate water sheds

e) Ground water access and control needs to be regulated in case of over exploitation

f) Create provisions for ensuring minimum and equitable access to water for all with an entitlement approach where minimum water is assured.

g) Better coordination between different departments involved.

Middle order approach

This order comprises of community social organizations, CSO's, water experts and researchers. These are placed in middle as they are the link between the top and bottom level stakeholders.

a) Water experts:

   i. They play a major role as they have the responsibility of databases pertaining to water issues. This helps the policymakers to measure equity and access to water.

   ii. They help the government build a plan and management system with strong decentralization agenda.

b) Community social organization - CSO's.

   i. Build momentum to raise awareness and establish water as a basic human right

   ii. Can do proper documentation of best practices

   iii. Develop an understanding over convergence of departments such as health and education

i. Dealing for corruption and advocating good governance

ii. Capacity building and political will

Bottom approach:

This includes communities along with the people that form the root of any development initiative. At the root it is the community that is going to participate and benefitted.

a) They should assert their rights over natural resources and come forward as an inspector towards the response of the government

b) Ensure equitable distribution of natural resources such as water.

c) Ensuring democracy around water

d) Should ensure inclusiveness and rights for all.

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Appendix -1

List of Institutions

1. Government Upper primary school , Randathani
2. A.M.L.P school, Thozhanur
3. Bafakhy Yatheem Khana, Arts and Science college for women, kadungathukundu
4. GLPS, kadungathukundu
5. Najath school, Kizhakke Puram
6. Brilliant Arts college, kadunghathukundu
7. Al Manar ,H.S.S, Randathani
8. CMALP school, Chinakal
9. GMLP school , Kananchery
10. GMLP school , Manja chola
11. GMLP, Kalpakanchery
12. MSM Higher secondary school, Kallinga Paramabu
13. Government Vocational Higher secondary school, Kalpakanchery
14. EMALP school Paravanoor
15. GMLP school, Aiyrani
16. AMLP Thozhanur east
17. MES public school
18. GMLP Parammel

Appendix -2

List of Public water resources

Ponds

1. Ayirani Chira
2. Variyath Kulam
3. Kundan China Kulam
4. Kaingazhi Kulam
5. Thevar Kulam
6. Chaliya kulam
7. Bodu Kulam

Streams

1. Paravanoor Chola
2. Variyathu thodu
3. Manjha Chola or Thottungal thodu

Appendix 3

Household water security plan survey format

Block: Gram Panchayat:

Ward No.

Village: Habitation:

A	**Basic information**								
1	Household Head Name:								
2	Category (BPL , APL) Belonging to SC/ ST/ Minorities/ Others								
3	No. of family members	Male	Female	Children	Total				
B	**Source**								
4	Source of water (Public, Private)								
5	If Public, Type of source								
	Open Wells	Borewell	Spring	Stream	Ponds	PWSS	Street Standpost (PWS)(6)	House Connection	Others (Specify)
6	If Private type of source	Open Wells	Borewell	Ponds	Springs	Others			
	Year of construction								
	Maintenance (Yearly, two years or so)								
7	Distance between house and water source point in meters (below 100 m - 200m - 1, 200 - 500 m-2, above 500 m - 3)								

8	Whether water availability is round the year (Yes - 1, No- 2)				
9	If No, how many month it remains dry / inadequate				
C	**Water requirement for HH consumption**				
10	Use / consumption of water for family in L	Drinking/ cooking	Washing utensils	other purposes	Total
11	Type of source used		Drinking/ cooking	Washing utensils	other purposes
12	Whether the available water is adequate for drinking/cooking purpose (Yes , No) What is the amount of water charge you pay ? How much time does it take to fetch water for domestic needs (to reach the source and fetch water from there in minutes) 0-30 min, 30 min – 1 hr, 1 hr and above Who fetches water normally in your house Men Women Male children Female children Helper/ others				
13	If no, additional demand in litres		Drinking / Cooking	other purposes	total
D	**Household water management**				
14	Is there any storage facility available in the Household (Yes, No)				
15	If yes, HH level storage capacity available in L		Drinking/cooking	other purposes	total
H	**Additional**				

	information				
16	Whether HH is having toilet facility (Yes-1, No-2) How many toilets are there? Distance of septic tank from the well -				
17	Whether HH is having RWH structures?(Yes-1, No-2)				
18	Willingness to construct RWH in house (Yes - 1, No -2)				
19	Approximate roof area of house (in sq.m)				
I	**Water budget**				
20	Requirement/ Demand of water for the family		Drinking/cooking	other purposes	Total
21	Current availability of water		Drinking/cooking	other purposes	Total
22	Balance requirement		Drinking/cooking	other purposes	Total

Appendix 4

Institutional Survey Form

Institutional water security plan format

Institutional water security plan - Baseline Survey

Proforma No.

Block: Gram Panchayat:

Village: Location:

A	**Basic information**											
1	Institution Name:											
2	If school, No. of Students, if other institution means the total no. of persons	Students			Teaching Staff			Non – Teaching Staff			Total	
		Boys	Girls	Total	Male	Female	Total	Male	Female	Total		
B	**Source**											
3	Source of water	Open Wells	Borewells	Hand pump	PWS	Ponds	Streams					
4	Location of Hand pump (Inside the campus,Outside the campus)											
5	PWS connection (Inside school, Outside school)											
6	Supply of water through PWS (Continuous, intermittent)											
7	Distance between Institution and water source point in meters											
8	Whether water availability is round the year (Yes, No)											
9	If No, how many months it remains dry											
10	Distance of water source from septic tank											

	Source A	Source B	Source C	Source D	Source E
C	**Water requirement for Institution consumption**				
11	Use / consumption of water in L		Drinking/cooking	other purposes	Total
12	Type of source used (specify)			Drinking/cooking	Other purposes
13	Whether the available water is adequate (Yes, No)				
14	If no, additional demand in Ltrs		Drinking/cooking	other purposes	total
D	**Institutional water management**				
15	Is there any storage facility available in the Institution (Yes, No)				
16	If yes, storage capacity available in Ltrs		Drinking/cooking	other purposes	total
17	Do the institution have any water filter (yes, no)				
18	If yes, is it regularly used? (yes, no)				
19	If no, would they like to have filter? (yes, no)				
E	**Additional information**				
20	Whether institution is having toilet facility (Yes, No) No. of toilets – Girls_____ Boys_____ No. of toilets for staff _____ a) Whether toilet for students has adequate facility for cleaning and handwashing? b) Who cleans the toilet?				
21	Whether institution is having RWH structures?(Yes, No)				
22	Type of building (Tiles, Concrete, Thatched)				
23	Willingness to construct RWH (Yes, No)				

24	Approximate roof area of school building	
F	**Water budget**	
25	Requirement of water for the institution	
26	Supply of water for the institution	
27	Balance requirement	

Appendix 5

Public water Resources Assessment Format

_____

1. Location (ward) - _____
2. Type of Public Source – Open well ☐ Pond ☐ Stream ☐ ☐ Spring
3. Area/ Dimension – _____ Diameter _____ Depth _____
4. Whether the source is in use?
5. If yes, then for what purpose is the water being used? (Drinking/cooking, washing or other) _____
6. If not in use, then reason for the same –

   Poor maintenance ☐ Source gone dry ☐ Reduced water availability ☐ Reluctance of local bodies in maintenance ☐ Contamination ☐ Population increase ☐ Fund Shortage ☐
7. Bottom of the well (Rock/Soil) - _____
8. Year of Construction - _____
9. Year of last maintenance - _____
10. If maintained then who did it? _____
11. No. of families using the source _____
12. Do the families using the public well/pond have any source of water? (Yes/No)_____
13. If yes, specify the source _____

14. Covering of the Well _____

15. Means by which water from the source is accessed (Electric Pump/Hand pump)

16. If water is being accessed through electric pump then who has financed it?

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