INTEGRATED WATERSHED MANAGEMENT PROGRAMME (IWMP)

EKM / IWMP-II /2011-12

MULANTHURUTHY BLOCK PANCHAYATH

DETAILED PROJECT REPORT (DPR)

Prepared By

WDT: MULANTHURUTHY BLOCK PANCHAYATH AND

YOUTH SOCIAL SERVICE ORGANIZATION (YSSO)

CONTENTS

ABBREVIATIONS

APL	Above Poverty Line
AAP	Annual Action Plan
BLCC	Block Level Coordination Committee
BPL	Below Poverty Line
BRGF	Backward Regions Grant Fund
CEO	Chief Executive Officer
CSES	Centre for Socio-economic and Environmental Studies
DLCC	District Level Coordination Committee
DPC	District Planning Committee
DPR	Detailed Project Report
EPA	Entry Point Activities
FGD	Focus Group Discussion
GIS	Geographic Information System
GP	Grama Panchayat
GW	Ground Water
IEC	Information, Education and Communication
IT	Information Technology
IWMP	Integrated Watershed Management Programme
LFA	Logical Framework Analysis
LSGD	Local Self Government Department
LSGI	Local Self Government Institutions
LSS	Livelihood Support System
MCM	Million Cubic Meters
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MLA LAD	Member of Legislative Assembly Local Area Development scheme
MoU	Memorandum of Understanding
MPLAD	Member of Parliament Local Area Development
MSL	Mean Sea Level
MWS	MicroWatershed
NABARD	National Bank for Agriculture and Rural Development

NGO	Non-Governmental Organization
NRAA	National Rainfed Areas Authority
NRHM	National Rural Health Mission
NRM	Natural Resource Management
OBC	Other Backward Caste
PIA	Project Implementing Agency
PRA	Participatory Rural Appraisal
PRIs	Panchayath Raj Institution
PS&M	Production System and Microenterprises
SC	Scheduled Caste
SHG	Self Help Group
SLNA	State Level Nodal Agency
SPSP	State Perspective and Strategic Plan
ST	Scheduled Tribe
SHM	State Horticulture Mission
TSO	Technical Support Organization
UG	User Group
VEO	Village Extension Officer
WC	Watershed Committee
WCC	Watershed Coordination Committee
WCDC	Watershed Cell cum Data Centre
WDT	Watershed Development Team
WW	Women Welfare

EXECUTIVE SUMMARY

Resources are the basis for the development of any country. India, one of the largest countries in the world, is blessed with diverse and abundant resources. Only judicious use of resources will help in the development of a country. Over exploitation and unscientific land-use practices will lead to environmental problems and resource depletion. In India agriculture is heavily dependent on the monsoon rains. Rainfall has always been erratic and unreliable. Its erratic nature has been compounded by climate change. India is facing unprecedented crisis and challenges on the agricultural front, calling for all our efforts at improving agronomic practices across the country. Sustainable development demands that we protect our environment and conserve our natural resource. Exploding population coupled with steep depletion of natural resource makes conservation of natural resources more demanding than ever before. Natural resource management approach assumes great importance in this context. Adopting development practices, based on natural resource management, with special focus on land and water management, will surely result in the restoration and stabilization of natural resource and pave the way for the rejuvenation of rural economy.

Watershed management in an integrated approach has been advocated as the best strategy for conserving the natural resources like water, soil and bio-mass. A watershed is a natural unit of sustainable development. Eleventh Five Year Plan has proposed Watershed management activities for ensuring rural development. Watershed approach aims at augmentation and stabilization of production and productivity, minimizing the ecological degradation and generating and maintaining sustainable rural development in rain-fed areas. It was in this context that Govt. of India decided to implement watershed management projects in the distressed districts in India.

The IWMP-2/2011-12 project, comprising four micro watershed and covering four Gramapanchayath and one municipality in a total of 3812 Ha in Mulanthuruthy Block Panchayath is inhabited by a total population of 77944 people, mostly of small and marginal farmers. Mulamthuruthy Block Panchayath has been selected as the Implementing Agency of this project. As a prelude to the implementation phase of the project with a view to preparing the Detailed Project Report, a feasibility study has been conducted.

The participatory study conducted identified the core problems as severe soil erosion , acute water scarcity, siltation of water storage and harvesting structures, uncultivated fallow agricultural lands, lack of conservation measures of agriculture and non-agriculture lands , increasing cost of production and lack of livelihood opportunities.

The solution identified include building up the natural resource base through interventions in the areas of soil and water conservation, bio-mass improvement through agro-forestry, promotion of improved agronomic practices and livelihood enterprises. With this as a solid base, we are proposing a watershed development with activities roof top rain water harvesting structures, renovation of dugout farm ponds, rain pits, well recharging, earth bunds, construction of embankment type dugout farm ponds, side protection of streams, roof top rainwater harvesting tanks, culverts, sluices , mulching, crescent bunding / centripetal terraces, renovation and construction of check dams. To improve the production system of the area this project plans to promote the practice of biological farming and animal husbandry. The various activities included can be listed as cultivation of various crops, construction of Biomethanation plants supply of milky machine, cow dug pit construction, supply of chaff cutter and grow bags etc. The livelihood opportunities proposed include poultry, goat farming, fish processing, beekeeping, rabbit rearing, duck rearing, mushroom cultivation flower cultivation and adukkalathottam.

The project has high sustainability as it will promote low cost, long lasting methods capable of protecting the natural resources of soil, water and biomass through the involvement and participation of the stakeholders, ensuring the equitable distribution of the project benefits by promoting various production management systems.

CHAPTER I
Introduction

Integrated Watershed Management Programme was emerged as a new paradigm for planning, development and management of land, water and biomass resources with a focus on social and institutional aspects apart from biophysical aspects. Integrated Watershed Management becomes increasingly important as a way to improve livelihood of people while conserving and regenerating the natural resource. Integrated Watershed Management Programme is therefore linked with community and the people whose socio economic and cultural backgrounds play a decisive role in meaningful planning, implementation and sustainability.

1.1 Project Background

The IWMP-II/2011-12 project, comprising four micro watershed and covering four Gramapanchayaths and one municipality in a total of 3812 Ha in Mulanthuruthy Block Panchayath is inhabited by a total population of 77944 people, mostly of small and marginal farmers. Mulanthuruthy Block Panchayath has been selected as the Implementing Agency of this project. As a prelude to the implementation phase of the project with a view to preparing the Detailed Project Report, a feasibility study has been conducted.

1.2. Need and Scope for Watershed Development

Loss of vegetative cover followed by soil degradation through various forms of erosion has resulted into lands which are thirsty in terms of water as well as hungry in terms of soil nutrients. All these regions lack live stock centered farming systems, less biomass for animals which in turn reduces animal productivity .A deteriorated ecological balance is seen in the area.

The Integrated Watershed Management Programme (IWMP) aims to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil,vegetative cover and water. The need for integrated watershed management arises because of the water scarcity, rapid depletion of ground water table and fragile ecosystems and the incidence of poverty in the area. Land degradation due to soil erosion, low rainwater use efficiency, high population pressure, low livestock productivity, underinvestment in water use efficiency are also observed. The scope of IWMP in the project area, therefore, includes

identifying activities that will help to improve the livelihoods of the population in a sustainable manner through participatory watershed development. The expected outcomes are prevention of soil erosion, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi cropping and the introduction of diverse agro-based activities, which will help to provide sustainable livelihoods to the people residing in the watershed area..

1.3. Objectives of the Project.

- Main objective of IWMP is to preserve and conserve the ecology, restore and develop degraded natural resources by arresting soil loss, improving soil health and soil moisture.
- Rain water harvesting and recharging of ground water table enables multi cropping and introduction of diverse agro based activities which help to provide sustainable livelihood to the people residing in watershed area.
- Promotion of livestock development, fishery management, and to encourage dairying and marketing of dairy products.
- Improving the capacity of community to manage common natural resources.
- Enhancing the efficiency and effectiveness of rain water and runoff use, improving the vegetative cover and reducing the soil erosion through better rain water management.
- Conserving as much rain water as possible in the place where it falls and also increasing the ground water level to get water throughout the year and maintaining it for sustainability.

Utilizing the available land to its maximum productivity by adopting various or suitable measures according to the land capability and without any environmental degradation.

Table 1.1 Project background of IWMP-II/2011-12

Location	Micro Watersheds		Grama Panchayath	Wards		Total Area (ha)	Treatable Area (ha)	Project Amount (Lakhs)
	Name of Micro Watershed	Code No.		Full	Partial			
State : Kerala **District: Ernakulam** **Block: Mulanthuruthy**	Puthiyakavu	13 M 8a	Udayamperoor	1,2,19,20	3	103	103	**45744000**
	Ameda	13M 7a	Udayamperoor	16,17,18	5,6	345	345	
	Kunnathunadu-Thalakkode	13 M 19d	Thripunithura Chottanikkara Thiruvaniyoor	23 1 to 14 10,12	0 0 11	1033	1033	
	Vattukunnu-Karingachira	13 M 20a	Thripunithura Mulanthuruthy Udayamperoor	4,5,6,11,12,13,14,15,16,22,24,25 1,2,3,12,13,15,16 4	0 14 5,3	2331	2331	

1.4. Organizational Set-Up of IWMP

Figure 1. **Organizational Set-Up of IWMP**

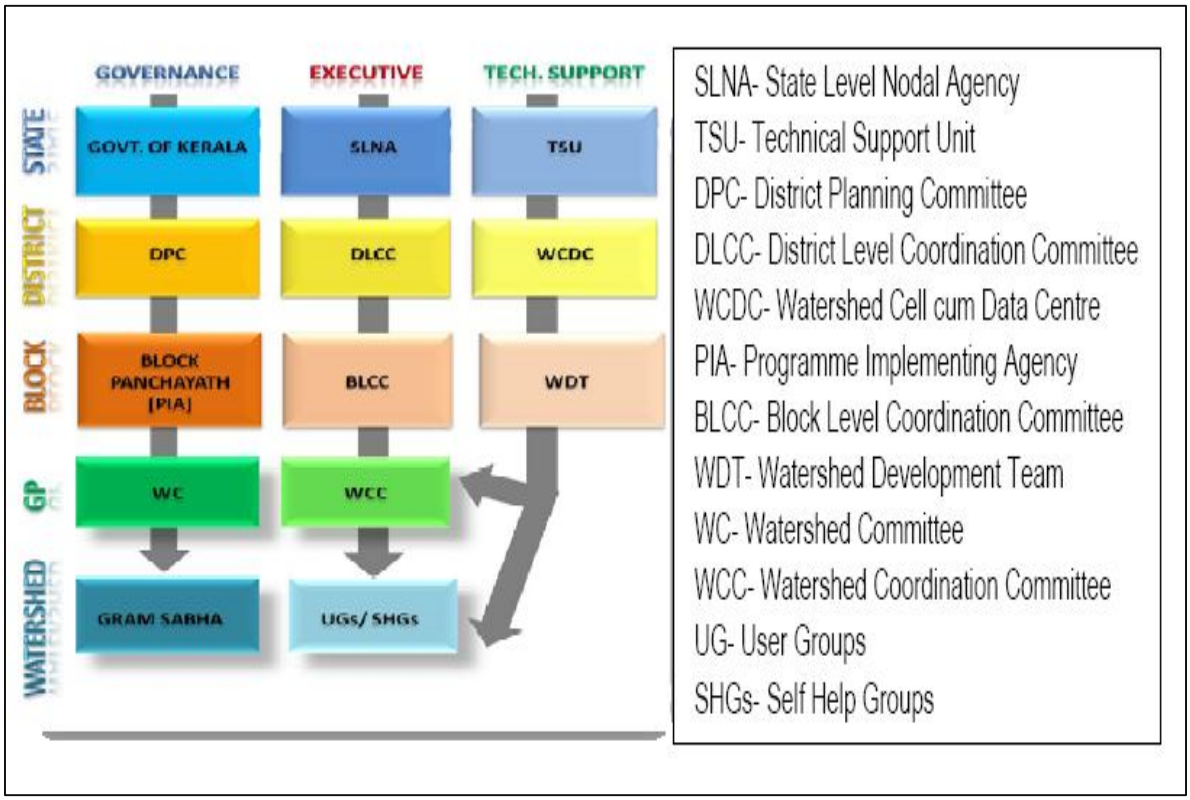


Table1.2. - IWMP II/2011-12 – Financial Plan

Name of Project	Name of PIA	No. of Micro Watershed	Project Area (ha)	Project Cost (Lakhs)	Central Share 90%(Lakhs)	State Share 10%(Lakhs)
EKM-II/IWMP-II / 2011-12	Mulanthuruthy Block Panchayath	4	3812	457.44	411.696	45.744

Table1.2.1 - IWMP II/2011-12 – Financial Plan of Activities

Si no.	Activities of IWMP	%	Amount (Rs.)
1	Natural Resource Management	56	25616640
2	Production System Management	10	4574400
3	Livelihood Programme	9	4116960
4	Administrative Cost	10	4574400
5	Entry Point Activity	4	1829760
6	Capacity Building	5	2287200
7	Monitoring	1	457440
8	Evaluation	1	457440
9	Detailed Project Report	1	457440
10	Consolidation	3	1372320
Total		100	**45744000**

1.5. Approach and Methodology of Preparing the Detailed Project Report (DPR)

The project area lies in Mulanthuruthy Block Panchayat of Ernakulam district. The common guidelines provide a flexible framework the preparation of the Detailed Project Report of IWMP-II/2011-12 of Ernakulam District is outlined below**.**

- The project comprises of four micro watersheds. A cluster approach has been followed in the preparation of DPR.
- Review of the official documents on MGNREGS at the national and state levels was done prior to the field level activities.
- Preliminary discussions with elected representatives and officials at the block and district level were conducted.
- Secondary Data: The DPR has to be based on the situation analysis of secondary data and information available from various sources. Basic information about the watershed available from various sources. Basic information about the watershed such as rainfall, temperature. Location, topography ,hydrology, hydrogeology, soils, geology and geomorphology, demographic and socio-economic characteristics of the population, land-use pattern, major crops and productivity, soil and water conservation practices adopted, irrigation, livestock and microenterprises were collected from different sources such as Census of India, development reports, publications of government departments etc.

- Baseline Survey: A detailed baseline survey was conducted covering all households in the project area. The database thus created is expected to facilitate the assessment of the impact of the watershed development programme on the project area during and after the implementation of the project.
- Participatory Rural Appraisal (PRA) : The participation of stakeholders is essential in identifying the problems and needs of the people in the project area and in identifying suitable watershed development activities. A logical Framework Analysis was done at the project level for identifying the important problems (through problem tree analysis) as well as for the purpose of assessing the present situation. Other PRA techniques like transect walk, social mapping, resource mapping, seasonal calendar, etc, were employed in each micro watershed area.
- Use of GIS and Remote Sensing for Planning: GIS and remote sensing devices have made use in the preparation of DPR. Quantum GIS Software was used for preparation of maps. Google Earth images of the project area were also used for the planning. 1:4000 scale cadastral maps of each village were the base map for planning.
- In depth interviews, Focused group Discussions with officials, farmers, entrepreneurs of micro-enterprises etc. were undertaken.
- An assessment of the resources likely to be available from other sources and schemes was done in the initial stages of the plan preparation.
- Field level verification of the identified interventions was undertaken by the DPR preparation team which includes the Technical Support Organisation, Watershed Development Team and Watershed Cell come Data Centre.
- Prioritization: prioritization of the interventions was done taking into account the scientific and technical inputs.
- Identification of Entry Point Activities: The entry point activities were identified taking into account its potential as a model for replication.
- IEC and Capacity Building: IEC and capacity Building plan has been formulated to achieve the desired results from watershed management programmes.

CHAPTER II
THE PROJECT AREA

2.1. Introduction

Ernakulam is one of the most developed districts in the State. Kochi, the "Queen of Arabian Sea" is often described as the industrial and commercial capital of Kerala. This district was formed in 1958 by carving the regions from Thrissur and Kottayam district. The district comprises the area of the east Travancore, Cochin and Malabar states. Kochi, Kanayannur, Paravoor, Aluva, Kunnathunadu, Muvattupuzha and Kothamangalam are the seven taluks of this district. Mulamthuruthy is a small town in Eranakulam district of Kerala. It is about 21 km south-east of Eranakulam and 8km east of Thripunithura. Mulamthuruthy also hold the gramapanchayath and the block panchayath with the same name.

Table 2.1 Basic Project information

Name of Project	District/PIA/ Block	No of micro watersheds	Total area (ha)	Treatable area (ha)	Geographical Co-ordinates	Grama Panchayath covered	Estimated cost (Crores)
EKM-II/IWMP-II/ 2011-12	District: Ernakulam Block/PIA: Mulanthuruthy	4	3812	3812	9^0 52'30" & 9^0 59'15"**N** 76^0 20'15" &$76^0$25'30**E**	5	4.584

2.2. Location

Location of Mulanthuruthy block panchayath as per the Geograhic coordinates are 9 ^{0}44'3"N – 76^{0}23'24"E and 9^{0}90'08" N – 76^{0}39'00"E respectively. The project area lies between 9^0 52'30" & 9^0 59'15" North latitude and 76^0 20'15" & 76^0 25'30" East longitudinal extension. Mulanthuruthy (IWMP II) project is located in Mulanthuruthy Block Panchayath of Eranakulam district, Kerala. The project comprises of four micro-watersheds namely Ameda (13M 7a), Puthiyakavu (13M 8a), Kunnathunadu-Thalakkode (13M 20a) and Vattukunnu-Karingachira (13M 19d). The project, with an area of 3812hectares has been selected for treatment under the Integrated Watershed Management Programme (IWMP). The project area covers the Grama Panchayaths Mulanthuruthy, Chottanikkara, Udayamperoor of Mulanthuruthy Block Panchayath and Thiruvaniyoor panchayath of Vadavucod-Puthenkruz Block Panchayath. The project area is also covers some area of Thripunithura municipality too. The project area lies in the low land to mid up land area of Eranakulam district.

2.2 Details of Micro watersheds in the Project Area

Table.2.2. Details of Micro Watershed in the Project Area

Name of Micro Watershed	MWS Code	Area (ha)	Geo-Coordinates	Gramapanchayath / Municipality	Wards covered	
					Full	Partial
Ameda	13M 7a	345	9^{0}54'45"N-9^{0}56'15"L &76^{0}2015"E-76^{0}21'45E"	Udayamperoor	16,17,18	5,6
Puthiyakavu	13M 8a	103	9^{0}55'30"N-9^{0}54'0"L &76^{0}21'0"E-76^{0}22'30E"	Udayamperoor	1,2,19,20	3
Kunnathunadu-Thalakkod	13m 19d	1033	9^{0}57'0"N-9^{0}54'0"L &76^{0}22'30"E-76^{0}24'55e"	Chottanikkara,	1 to 14	0
				Thiruvaniyoor,	10,12	11
				Thripunithura	23	0
Vattukunnu-Karingachira	13m 20a	2331	9^{0}48'33.393"N-9^{0}50'52"L &76^{0}44'41"E-76^{0}46'33e"	Thripunithura,	4,5,6,11,12, 13,14,15,16, 22,24,25	0
				Mulanthuruthy,	1,2,3,12,13, 15,16	14
				Udayamperoor	4	5,3
Total		**3812**				

2.3 Criteria for Selection of the Project Area

Integrated Watershed Management Programme is prioritized on the basis of thirteen parameters namely poverty index, percentage of SC/ST, actual wages, percentage of small and marginal farmers, ground water status, moisture Index, area under rain fed agriculture, drinking water situation in the area, percentage of the degraded land, productivity potential of the land, continuity of another watershed that has already developed/treated, cluster approach for plain or for hilly terrain. Based on these thirteen parameters, weightage and criteria for selection of the watershed management programmes, IWMP II / 2011-12 in Mulanthuruthy block Panchayath is given in Table 2.3.1

Table.2.3.1 Criteria for Selection

No	Criteria	Score	Ranges and scores			
1	Poverty index (% of poor to population)	10	Above 80% (10)	80 to 50% (7.5)	50 to 20 % (5)	Below 20% (2.5)
2	% of SC/ST population	10	More than 40% (10)	20-40% (5)	Less than 20% (3)	
3	Actual wages	5	Actual wages as significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages		
4	% of small and marginal farmers	10	More than 80% (5)	50 to 80% (50%)	Less than 50% (3)	
5	Ground water status	5	Over exploited (5)	Critical (3)	Sub critical (2)	Safe (0)
6	Moisture index/	15	-66.7 and below (15)	-33.3 to -66.6 (10)	0 to -33.2 (0)	
	DPAD/DDP block		DDP block	DPAD block	On DPAD/DDP block	Above 70% (reject)
7	Area under rain fed agriculture	15	More than 90% (15)	80 to 90% (10)	70 to 80% (5)	Fully covered (0)
8	Drinking water	10	No sources (10)	Problematic village (7.5)	Partially covered (5)	
9	Degraded land	15	High-above 20% (15)	Medium- 10 to 20 % (10)	Low- less than 10% of TAJ (50	
10	Productivity potential of the land	15	Lands with low production and where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production and where productivity can be enhanced with reasonable efforts (10)	Lands with high production and where productivity can be marginally enhanced with reasonable efforts (5)	
11	Contiguity to another water shed that has already been developed/treated	10	Contiguous to previously treated watershed and contiguity within the micro watersheds in the project (10)	Contiguity within the micro watersheds in the project by non contiguous to previously treated watersheds (5)	Neither contagious to previously treated watershed nor contiguity within the micro watersheds in the projects (0)	
12	Cluster approach in the planes (more than one contiguous micro-water sheds in the projects)	15	Above 6 micro watersheds in the cluster	4 to 6 m icro watersheds in cluster (10)	2 to 4 micro watersheds in cluster (5)	
	Cluster approach in the hills (more than one contiguous micro-water sheds in the projects)		Above 5 watersheds in the cluster (15)	3 to 5 micro watersheds in cluster (10)	2 to 3 micro watersheds in cluster (5)	

Table 2.3.2 Weightage under different criteria

Project Name	Awarded Scores as per the Weightage Criteria*												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
EKM-II/IWMP-II/2011-12	7.5	3	10	5	3	0	10	7.5	10	10	5	10	81

** Scores are given as per the Table- Criteria and weightage for selection of watersheds*

2.4 Physiography-Relief-Drainage

The major Physiography identified in Ernakulam district is lowland (< 7.5 m from MSL), midland (7.5-75 m from MSL) and hill land (>75 m from MSL). The project area is in the lowland and midland division. The ridge areas of the project mainly lie in the south-west side of the Kunnathunadu-Thalakkode watershed and in the south side of the Vattakunnu-Karingachira watershed. The major drainage is Muvattupuzha river the subdrainages are Chithrapuzha, Konathupuzha, Panarthodu, Adiyakkalthodu. Some of these streams are flowing to the river Muvattupuzha and the rest have its mouth in the Vembanad kayal. The major drainage coinciding with the project area is the Vembanadu Kayal. The relief of the project area is flat to concave.

Table 2.4. Physiography-Relief-Slope-Drainage

Project Name	Physiography	Relief	Slope Range	Major Drainage	Sub Drainages
EKM-II/ IWMP-II/ 2011-12	Low Land Mid Land	Flat to Concave	Moderate to Strong	Muvattupuzha River	Chithrapuzha Konathupuzha Panarthodu Adiyakkalthodu

2.5 Slope

The slope of the project area as per the map-5, the slope is from south to north and east to west, which means slope, is towards Muvattupuzha River and Vembanadu Backwater. Slope of the project area is shown below in table 2.5.

Table.2.5. Slope of the Project Area

Slope	Slope	Area(Ha)	%
Moderately sloping	5-10%	3740	98.11%
Mod steep to steep	10 - 15%	42	1.1%
Strongly sloping	15 - 33%	30	0.78%
Very steep	-	-	-
Very Very steep	-	-	-
Total		3812	100

The above table summarizes the entire slope of the project area. The majority area covers moderately sloping (5-10%) which is 98.11% of the area. The slope map of the project area is given below (Map-5).

2.6. Geology

The geology of the project area says that, the major portions of the project area is covered with crystalline rocks and unconsolidated sediments. There are also slight compositions of semi-consolidated sediments in some regions. The area is also covered with much water allocating as well as flowing structures of water bodies. The major portions of the project area are covered with both crystalline rocks and un-consolidated sediments by comparatively equal halves. The areas of semi consolidated sediments are comparatively very less. Geology map of the project area is given here.

2.7. Geomorphology

The geomorphology of the project area is composed of flood plains, lower plateau, old coastal plains, valleys, younger mud- tidal flat (young coastal plain) and rivers. The majority of the project area is composed of old coastal plains. About the major portions of Ameda, Puthiyakavu and Vattukunnu-Karingachira are filled with old coastal plains. The other visible morphology is composed of lower plateau (lateritic) area inter mixed with small valleys and is mainly found in Kunnathunadu-Thalakkodu watershed area. There are also some flood plains near to the boundary of the Kunnathunadu-Thalakkodu and Vattukunnu-Karingachira

watersheds. There are some tidal flat (young coastal plain) in the Udayamperoor gramapanchayath in the banks of Vembanadu Backwaters. There is also some visible water allocating structures in the project area. Briefly the project area is mainly geo-morphologically composed of lower plateau (lateritic) and old coastal plain.

2.8.Climate

2.8.1. Rainfall

Ernakulam district has wet monsoon type of climate. The district experiences heavy rainfall during southwest monsoon season followed by northeast monsoon. During the other months the rainfall is considerably less. March, April and May months are the hottest. December to February months are the coldest. The annual rainfall ranges from 3233 to 3456 mm at different places of the district. The district receive on an average 3359.2 mm (based on 1901-99 data) of rainfall annually. The district received the maximum rainfall around Neriamangalam area. The rainfall is less in the western part and increase towards the east. Based on normal annual rainfall Mulanthuruthy receives around 3233 mm annually.

Rainfall during South-west monsoon season contributes nearly 67.4% of total rainfall of the year, followed by the north-east monsoon which contributes nearly 16.6% and the balance of 16% is received during the month of January to May as summer/pre-monsoon showers.

2.8.2. Temperature

The maximum, minimum and mean temperature of the watershed are 30.70, 23.80^{0}C and 27.30^{0}C respectively. The maximum temperature is experienced during the month of March and minimum during the month of December

2.8.3. Humidity

The humidity of the watershed ranges from 83% to 88% at 7-20 hrs and 70% to 80% at 14-30 hrs.

2.8.1. Rainfall

Table.2.8.1.Average Rainfall over Last 10 Years

Weather data (2002-2012) Rain fall data										
Months	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Jan	1.2	2.1	0	10.7	13.7	0	0	0.4	17.2	20.4
Feb	3.6	36.1	3	0	0	0	41.8	0	0	118
Mar	54	77.4	87.2	16.5	103.6	0	206.4	26.8	7.8	35
Apr	219.2	225.7	176.7	247.4	88.9	194.1	237	54.4	303	163.4
May	464.4	262.5	699.4	247.5	102.6	116.7	126.4	269	224.6	88.4
Jun	491	504.3	593.7	758	451.9	711.8	425.6	477.5	690.8	739
Jul	421.3	517.1	563.3	1006	601.2	1016	454.6	784.7	611	683.2
Aug	487.3	434.6	487.6	35.62	474.4	549.4	547.9	368.6	436.4	645.4
Sep	112.6	120.6	242	67.04	610.4	505.2	469.8	364.4	391.6	465.3
Oct	536.9	700.3	423	260.2	406.9	416.2	367.8	197	501.2	243.6
Nov	182.1	133	90	167.5	421.5	147	704	390.2	472	164.5
Dec	0	0	0	12	14.2	24	9.2	146.8	43.2	124.4
Total (Annual)										
Max.(Annual)	536.9	700.3	699.4	1006	610.4	1016	704	784.7	690.8	739
Source: AMPRS Odakkaly										

2.8.2. Temperature

Table.2.8.2.Average Temperature over Last 10 Years

Month	Time	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Jan	08:30am	36	16.5	38	13.5	35	18.5	35	18	33.4	17	36	18	35.5	18	37	16	35.5	20	35	18
Feb	08:30am	38	16.5	38	13.5	36	20	36	17	36.5	18	36	21	35.5	20	37	19	38	19	37	17
Mar	08:30am	40	14.5	38	16.5	37.5	23	37	22	36	21	37	23	37	21	37.5	19	38	22.5	38	20
Apr	08:30am	37	19	38.5	15	35	21	36	22	34.5	23	37	20	35	22	38	24	37	23	37	21
May	08:30am	36	20.5	38	17.5	33.5	22.5	34	23	34.5	22	36	23	34	23	37	23	36	24	36	24
Jun	08:30am	35	18.5	37	16	33	22	33	23	33.5	23	35	22	33	23	35	22	35	22.5	33	23
Jul	08:30am	34	17	34	15.5	31	23	30	22	31	23	32	22	32.5	23	33	22	34	22	33	22
Aug	08:30am	35	14	33	16	31.5	22	31	23	32	22	32.5	22	34	22	33	23	33	22	33	23
Sep	08:30am	37	14	34	18	31.5	22.5	32	23	33	23	32	20.5	34	22	35	23	33	22	33.5	23
Oct	08:30am	36	14.5	33	18	33	22	33	21	32.5	22	34	22	35	22	35	22	33	22	34	23
Nov	08:30am	37	14.5	35	19	34	20	33.5	20	33.5	21.5	35	18.5	36	21	35	20	34	21.5	33	20
Dec	08:30am	38	12.5	35	18.5	33	18	34	18.5	33.5	19	35	20	36	17	36	19	33.5	21	35	18

2.8.3. Relative Humidity

Table.2.9.3. Average Relative Humidity over Last 10 Years

Month	Time	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
		RH	RH	RH	RH	RH	RH	RH	RH	RH	RH
Jan	08:30am	87.37	84.83	84.25	89.5	86.8	87.75	86	-	91.5	85.5
Feb	08:30am	83.98	87.5	83.25	88.9	80.9	89	84.5	-	86	77
Mar	08:30am	87.43	89.5	88.5	87.4	87.9	84.5	85	-	83.5	78
Apr	08:30am	92.33	89	92	92	87.8	84.75	92.5	-	92.5	76.5
May	08:30am	91.37	92.5	92	91.5	90.8	89.25	92.5	87.5	90.5	83
Jun	08:30am	92.21	92.75	93.75	94.1	91.8	88.5	95.5	89	96	90.5
Jul	08:30am	96.74	94.5	93.5	91.1	91.7	96	94	94	93.75	90
Aug	08:30am	95.98	94	89.25	92	92.2	94.5	96	96	96	88
Sep	08:30am	94.13	94	91.75	90.5	91.6	96	92	94.25	94.5	85.5
Oct	08:30am	95.4	93.75	93.75	91.8	92.5	92.5	90.5	89.25	95.75	78.25
Nov	08:30am	94.95	89.25	90.5	91.1	90.8	90.25	77.5	84.5	93.75	81
Dec	08:30am	88.5	90.5	88.5	89.4	81.2	88	77.5	94	91.5	79.75

2.9. Soil Details

Soils of the watershed vary in their depth, texture, internal drainage and degree of erosion. The salient attributes of the soils occurring in different physiographic regions of the watershed are furnished maps below. Soil texture (Map.8) and Soil erosion (Map.9) are shown here.

2.9.1 Soil Types

The main types of soils found in the project area are slity clay and sandy type of soils. Major part of the project area is covered with slity clay and the rest of the area is composed of sandy soil.

2.9.2 Soil Erosion Details

From the available data we can see that the project area has a majority of moderate erosion status. In some areas the erosion status is very severe and some areas facing gullied soil erosion.

2.10. Water Supply & Irrigation

Mulanthuruthy and the nearby areas are blessed with many Streams, rivers and other water allocating structures. Thus, agriculture related workers are commonly seen in this area. Majority of the farmers are going through their cultivation by depending on the minor irrigating structure of their nearby streams, ponds and other water resources. The main water body in the project area is the Konathupuzha and is a perennial stream of this area. Other streams and ponds are facing extreme drought during the summer season. The status of streams in the project area is very worst during the summer periods. The extremity of water scarcity may commonly ranges from 80-110 days in a year. In The project area, public irrigating structures are very less.

Table 2.10.1 Details of the Drains/Streams/Rivers in the Project Area

Watershed code	Grama Panchayath	Name of the Drains/Streams/Rivers	Perennial/seasonal
13M 8a	Udayamperoor	Konathupuzha	Perennial
13M 20a	Mulanthuruthy	Panarthodu	Perennial
13M 20a	Thripunithura	Chithrapuzha	Perennial
13M 19d	Thiruvaniyoor	Adiyakkal Thodu	Seasonal
13M 7a	Udayamperoor	Kuthukallingal Thodu	Seasonal
13M 7a	Udayamperoor	Veluthedathu Thodu	Seasonal
13M 7a	Udayamperoor	Ameda-Kalezhathu Thodu	Seasonal
13M 19d	Thiruvaniyoor	Kuppethazham Thodu	Seasonal
13M 8a	Udayamperoor	Athazhappilly Thodu	Seasonal

Table 2.10.2.Number of Perennial and Seasonal Streams major & minor of the ProjectArea

Watershed code	Name of watershed	Number of Perennial streams	Number of seasonal streams
13M 7a	Ameda	2	10
13M 8a	Puthiyakavu	2	6
13M 20a	Vattukunnu-Karingachira	3	26
13M 19d	Kunnathunadu-Thalakkode	1	17

2.11. Ground Water Details

The ground water availability and prosperity of the project area lies between the very good to moderate range. It means in some part of the project area the availability of ground water is good in some regions the ground water availability is moderate or limited. The ground water prosperity is given in the Map-10.

Table.2.11.1.Ground water Level

Name of Panchayath	Depth range			Prosperity
	Minimum Depth Range (Meter)	Maximum Depth Range(Meter)	Average Depth Range(Meter)	
Udayamperoor	5	4	4.5	Very Good
Chottanikkara	4	7	5.5	Moderate to very Good
Mulanthuruthy	4	7	5.5	Moderate to very Good
Thiruvaniyoor	4	9	6.5	Moderate
Thripunithura	4	6	5	Very Good

Source: Ground water department, Eranakulam District

Table 2.11.2 Water Availability in Wells

Watershed Code	Depth range		
	Minimum Depth (Meter)	Maximum Depth (Meter)	Average Depth (Meter)
13M 7a	5	4	4.5
13M 8a	5	4	4.5
13M 20a	4	7	5.5
13M 19d	4	9	6.5

Source : Random sampling

Table 2.11.3 Details of Ground Water Structures

Watershed Code	Public Wells	Public Tube Wells	Ponds
13M 7a	19	6	8
13M 8a	11	2	6
13M 20a	62	54	57
13M 19d	48	24	32

Source: Baseline survey

Table 2.11.4: Ground Water Status

Total Annual GW recharge (MCM)	26.69
Natural discharge during non-monsoon season (MCM)	2.42
Net annual GW availability (MCM)	24.02
Existing gross ground water draft for irrigation (MCM)	15.87
Existing gross ground water draft for domestic & industrial water supply(MCM)	5.21
Existing gross ground water draft for all uses (MCM)	21.08
Stage of GW development	87.76
Categorization for future GW development	Semi critical

Source:Ground water resource of Kerala state (as per GEC-1997) as on 31st March 2004

2.12 Socio-Economic Condition

The Socio-economic characteristics of the population in the project area has been obtained by conducting a censes survey of the households of the project area as may be seen from table 2.15 there are about 27512 households. The sex ratio in the project area is 40366 females, 37178 males.(Table.2.12.1)

Table.2.12.1 Socio-Economic Condition of the Project Area

Watershed Name	House Holds	Total Population	Male	Female	SC	ST	BPL (HH)	Large farmers (HH)	Land less	Farmers	
										Small	Marginal
Ameda	2751	7417	3404	4013	701	39	1557	46	214	948	280
Puthiyakavu	2967	8410	4088	4322	753	42	1649	58	231	972	321
Kunnathunadu-Thalakkod	8671	24539	11819	12720	2942	63	4907	276	684	4798	1982
Vattukunnu-Karingachira	13123	37178	17867	19311	5562	71	7209	132	1023	1701	1020
Total	**27512**	**77544**	**37178**	**40366**	**9958**	**215**	**15322**	**512**	**2152**	**8419**	**3603**

Table 2.12:2 Employment Analyses

Sl No.	Employment	Nos
1	Agriculture	9306
2	Business	7769
3	Coolie	9693
4	Government	11631
5	MGNREGS	5443
6	Pension	7870
7	Student	15928
8	others	9904
	Total	77544

Source: Primary data

Table.2.13: Type of Dwelling

House Type	No. of Families
Concrete	9690
Tiled	11739
Huts	4427
Temporary Shelter	1656
Total	27512

Source: Primary data

2.14: Livestock Population

Table.2.14.1 Livestock Population

Name of Watershed	Cattle		Buffaloes	Sheep	Goat	Pigs	Dogs	Fowls		
	Cross Breed	Indigenes	Total	Total	Total	Total	Total	Desi	Improved	Ducks
Ameda	1032	59	21	0	273	11	490	1543	806	65
Puthiyakavu	1290	76	27	0	351	14	381	1670	922	49
Kunnathunadu-Thalakkod	5676	1823	543	0	3423	131	5392	30120	15026	2547
Vattukunnu-Karingachira	18287	2157	912	0	8348	557	1929	21405	17452	785
Total	26285	4115	1503	0	12395	713	8192	54738	34206	3446

Table.2.15: Infrastructures of the Project Area

Si No.	Infrastructure	Number	Si No.	Infrastructure	Number
1	Angan Wadies	39	**12**	Mosque	6
2	LP School	7	**13**	Colony	12
3	Up School	4	**14**	Library	6
4	High School	4	**15**	Clubs	6
5	PHC	2	**16**	Madrassa	6
6	Clinic	8	**17**	Village Office	5
7	Banks	7	**18**	Agriculture Office	2
8	Post Office	4	**19**	Milma Society	2
9	Ration Shop	6	**20**	Dispensary	8
10	Market	3	**21**	Temple	13
11	Church	16		***Source: Primary Data***	

Table.2.16 Land Holding Size

Project Name	0-5 Cents	5-50	50-250	250-500	Above 500 cents	Land less
IWMP– II /2011-12	12022	3842	1400	900	110	2152

Source: Primary data **Table**

2.17. Major Crops / Vegetation in Micro Watersheds

The agriculture provides significant employment opportunities in the project area. Coconut is the principal crop grown followed by banana, rubber, paddy and tapioca. Activities allied to agriculture such as dairy, poultry and fishery also play a very important role in the economy of the project area.

Table 2.17.1.Cultivable Waste Land in the Project Area

Watershed Code	Area of Cultivable Waste Land (ha)	Problems	Suggestions
13M 7a	**22**	• Lack of interest of the land holder • Accumulation of water • Marshy land	• Lease farming required • Fish farming needed • Fodder Plantations can be done.
13M 8a	**12**		
13M 20a	**102**		
13M 19d	**47**		
Total	**183 Ha**		

Table 2.17.2: Land Use of the Project Area

Land Use	Area in ha
Coconut	687.61
Coconut dominant mixed crop	830.00
Current fallow	183.53
Double crop	371.46
Shrub's	29.69
Built-up	185.07
Mixed crop	905.70
Perennial	135.74
Rubber	451.44
Total	**3812**

CHAPTER III

INSTITUTION BUILDING AND PROJECT MANAGEMENT

3.1 Institutional arrangements of IWMP

By adopting the principles and guidelines of Integrated Watershed Management Programme (IWMP), appropriate institutional arrangements are made at various levels in order to have an effective and professional management of watershed projects.

3.1.1 Institution building at State and District Level

Department of Local Self Government is the nodal department for the implementation of IWMP at the state level. State Level Nodal Agency (SLNA) is coordinating and providing guidelines for the effective planning and implementation of the individual IWMP projects. District Planning Committee (DPC) is responsible for the planning and implementation of the projects at the district level. To help the DPC and to coordinate the project level activities Watershed Cell Cum Data Centre (WCDC) is working at the District level.

Table 3.1:1 Details of District Level Coordination Committee (DLCC)

Sl. No	Name	Designation
1	President, Ernakulam District Panchayat	Chairman
2	Collector, Ernakulam District	Member Secretary
3	Project Manager, IWMP	Convenor
4	Joint Programme Coordinator (MGNREGA)	Member
5	District Planning Officer	Member
6	District Animal Husbandry Officer Member	Member
7	District Soil Survey Officer	Member
8	District Soil Conservation Officer	Member
9	Deputy Director of Fisheries	Member
10	Executive Engineer, Minor irrigation/LSGD, Kerala Water Authority	Member
11	Divisional Forest Officers	Member
12	District Mission Co-ordinator, Kudumbasree	Member
13	District Officer, Ground Water Department	Member
14	Representative, Kerala Rural Water Supply Agency	Member
15	District Co-ordinator, *Information Kerala Mission*(*IKM*)	Member
16	District Co-ordinator, Horticulture Mission	Member

3.1.2. Institution building at Block Level

Mulanthuruthy Block Panchayat is the Project Implementation Agency (PIA) for this IWMP project. They are responsible for all the activities under the project starting from the preparation of Detailed Project Report (DPR) till the completion of project. A Block Level Coordination Committee (BLCC) has been formed for the timely implementation of the project and to provide help to the PIA in technical and administrative matters related to the project. Watershed Development Team (WDT) has been formed and started working under the PIA. Details of PIA are given below.

Table 3.1.2 Details of Project Implementation Agency (PIA)

1	**Name of the Project**	**IWMP II**
2	Programme Implementation Agency	Mulanthuruthy Block Panchayath
3	Implementation Officer	Secretary, Mulanthuruthy Block Panchayath
4	Address of PIA	Secretary, Mulanthuruthy Block Panchayath,Perumpilly pin 682314
5	Telephone	04842740303
6	Email	Iwmpmulanthuruthy@gmail.com

Table 3.1.3 Details of Block Level Coordination Committee (BLCC)

SLNO	Name	Designation
1	President, Mulanthuruthy Block	Chairman
2	President, Vadavukodu Block Panchayat, Thripunithura Municipality Chairman	Co-Chairman
3	Secretary, Mulanthuruthy Block Panchayat	Member Secretary
4	Assistant Director (Agriculture)	Technical Expert
5	PIA Block Vice President	Member
6	Development Standing Committee Chairman, Mulanthuruthy Block Panchayath	Member
7	Assistant Executive Engineer (LSGD)	Member
8	President Chottanikkara grama panchayat	Member
9	President Mulanthuruthy Grama Panchayath	Member
10	President Udayamproor Grama Panchayath	Member
11	President Thiruvaniyoor Grama Panchayth	Member
12	Joint Block DevelopmentOfficers (JBDO), (EGS)	Member
13	Extension Office Women Welfare (EOWW)	Member
14	Rpresentative Watershed Cell cum Data Centre(WCDC)	Member
15	Representative, Watershed Development Team(WDT)	Member
16	Representative, Technical Support Organization (TSO)	Member

Table 3.1.4: Details of Watershed Development Team (WDT)

SLNO	Name	Designation
1	Sainaba.K.N	Engineer
2	Savitha A.A	Social Mobilizer
3	Sandhya K.C	Agri-Expert
4	Parveen Bai	Data Entry Operator

3.1.3.Institution building at Grama Panchayat (GP) Level

Watershed management works are implemented at Grama Panchayat level. The GPs supervise, support and advise Watershed Committee. The different institution formed as part of IWMP are given below.

3.1.4. Watershed Committee (WC)

Watershed Committee has a pivotal role to play during and after the project implementation period. The dates of Neerthada Gramasabha convened in each watershed are given below. These Grama Sabhas constitutes the WCs for each watershed. These WCs will work as the subcommittees of Grama Panchayth s. In the case of Watersheds spread over more than one GP, separate subcommittees are formed in each GP to manage the watershed development project in the GP

Table 3.1.4.1 Dates of Neerthada Gramasabha

Sl No.	Name and code of Micro Watershed	Grama Panchayat	Date of Watershed Gramasabha
1	Ameda13M 7a	Udayamperoor	7/5/2013
2	Puthiyakavu13M 8a	Udayamperoor	7/5/2013
3	Vattukunnu-Karingachira 13m 20a	Udayamperoor,	2/5/2013
		Mulanthuruthy,	6/5/2013
		Thripunithura Municipality	13/5/2013
4	Kunnathunadu-Thalakkod13m 19d	Chottanikkara,	6/5/2013
		Thiruvaniyoor,	2/5/2013
		Thripunithura Municipality	13/5/2013

3.1.5 Self Help Groups

There are 1098 SHGs working in the project area already. These SHGs are registered in the Block. These groups are organized through credit and thrift activities. Some of the groups are alsoengaged in micro-enterprises also. These SHGs are formed either under SGSY scheme or under 71Kudumbasree. Both women and men SHGs are active in the project area

. **Table.3.1.5: Details of Self Help Groups (SHGs) working in the project area**

Watershed Name	No of SHG,s/Kudumbasree	People Registered Under MGNREGS
Ameda	40	590
Puthiyakavu	33	530
Kunnathunadu-Thalakkode	142	1774
Vattukunnu-Karingachira	70	2089
Total	285	4983

Source: Primary data

3.2.Capacity Building Activities

Institutional and capacity building plan is an indivisible part of IWMP as it strengthening the skills, competencies and abilities of people and communities in developing societies in order to overcome the causes of their exclusion and suffering. Each and every people, has to be trained initially for the smooth implementation of the project. It is proposed to carry out the following institutional based training and capacity building programmes during the project period in Order to equip various stakeholders for successful participation and implementation of the project. Capacity Building aims to assist groups or individuals to identify and address problems or issues the project area. It helps to gain insights, knowledge and experience which are needed to solve

Problems

3.3 Scope of Convergence

Table: 3.3.1Scope of Convergence

Sl. No.	Type of intervention	Department/Schemes which can be converged with IWMP
1.	Renovation of Pond	1. MGNREGA
2.	Bund Strengthening of Paddy fields	1. MGNREGA
3	Rain water harvesting Pit	1. MGNREGA
4	Vegetable cultivation	1. Department of agriculture
5	Horticulture	1. MGNREGA 2. SHA 3. Vegetable and Fruit Promotion Council
5.	Dairy development	1. Department of Dairy development
6.	Waste Management Activities	1.Total Sanitation Campaign 2.Nirmal Bharat Abhiyan 3.NRHM
7.	Exposure Visit	1. ATHMA

CHAPTER IV

MICRO WATERSHEDS IN THE PROJECT AREA

4.1 INTRODUCTION

The project IWMP II /2011-12 is a cluster of four micro-watersheds Ameda (13M 7a), Puthiyakavu (13M 8a), Kunnathunadu-Thalakkode (13M 19d) and Vattukunnu-Karingachira (13M 20a). The project, with an area of 3812hectares has been selected for treatment under the Integrated Watershed Management Programme (IWMP). The Ameda watershed is located in the Udayamperoor gramapanchyath specifically in 16, 17,18 wards and East to Vaikom-Thripunithura road of ward-5 and south to V.K Krishnamenon road of ward 6 and north to Pappanikunnu road. Pethiyakavu is also located in Udayamperoor Gramapanchayath and it located in 1, 2,19,20 wards and west to Konathupuzha and East to Vaikom-Thripunithura road of ward-3. Vattukunnu-Karingachira microwatershed is spread in two gramapanchayath and one municipal area Udayamperoor, Mulanthuruthy and Thripunithura respectively. It covers the 12 Divisions of the municipal area and covers 7 wards of Mulanthuruthy gramapanchayath with the border as panar thodu and Konathupuzha is the border of this micro watershed in Udayamperoor GP. Kunnathunadu-Thalakkode is also spread in three adiministrative areas namely ward 24 of Thripunithura municipality, ward 10,11 and 12 of Thiruvaniyoor GP and it covering all the areas of Chottanikkara GP. The details of each micro watershed in the project area are presented in this chapter.

4.2. LOCATION AND EXTENT OF MICRO WATERSHEDS

Table.4.2. The Location And Extent Of The Selected Watersheds In The Project Area

Name Of Micro Watershed	Code Of Micro Watershed	Location	Extent/ Area(ha)	Name Of GramaPanchayath	Wards Included
Ameda	13M 7a	**$76^0$20’15”E to $76^0$21’45”E $9^0$54’45”N to $9^0$56’15”N**	345	Udayamperoor	16,17,18, east to Vaikom-Thripunithura road of ward-5, South to V.K Krishnamenon road of ward-6, north to pappanikkunnu road
Puthiyakavu	13M 8a	**$76^0$21’0”E to $76^0$22’30”E $9^0$55’30”N to $9^0$54’0”N**	103	Udayamperoor	1,2,19,20 wards, west to Konathupuzha and East to Vaikom-Thripunithura road of ward-3.

Kunnathunadu -Thalakkodu	13M 19d	**76^{0}22'30"E to 76^{0}24'45"E 9^{0}57'0"N to 9^{0}54'0"N**	1033	Thripunithura	4,5,6,11,12,13,14,15,16,22,24,25 wards
				Mulanthuruthy	1,2,3,12,13,15,16wards, east to panar thodu and west to Thalayolaparambu road of ward 14
				Udayamperoor	Ward 4, east to Konathupuzha of Ward 5 and 3
Vattukunnu-Karingachira	13M 20a	**76^{0}21,0"E to 76^{0}24,0"E 9^{0}58'15"N to 9^{0}52'30"N**	2331	Thripunithura	Ward 23
				Chottanikkara	Ward 1 to 14
				Thiruvaniyoor	Ward 10 and 12, south to Thiruvaniyoor PWD road of Ward11.

4.3. PUTHIYAKAVU WATERSHED (13M 8a)

The latitudinal extension of the watershed is 76^{0}21'0"E to 76^{0}22'30"E and longitudinal 9^{0}55'30"N to 9^{0}54'0"N. The total area of the watershed is 103 hectares. The wads of the watershed are 1,2,19,,20 Wards, West to Konothupuzha and East to Vaikom-Thripunithura road of ward3 of Udayamperoor gramapanchayath.

4.4.1 Genearal Information of the Watershed

Table.4.4.1 General Information

Name of Watershed	Puthiyakavu
Watershed code	13M 8a
Name of Panchayath	Udayamperoor
Geographical Area	103 ha
Average Slope	5-10%
Length of Main stream	2.3 kms
Name of Village	Thekkumbhagom
Allotted amount(Lacs)	123.6

4.4 AMEDA WATERSHED (13M 7a)

The latitudinal extension of the watershed is 9^{0}54'45"N to 9^{0}56'15"N and longitudinal 76^{0}20'15"E to 76^{0}21'45"E. The total area of the watershed is 345 hectares. The wads of the watershed are 16,17,18 wards, East to Vaikom-Thripunithura road of ward 5,South to V.K Krishnamenon road of ward 6,North to Pappanikkunnu road of Udayamperoor gramapanchayath.

4.4.1 General Information of the Watershed

Table.4.4.1: General Information

Name of Watershed	Ameda
Watershed code	13M 7a
Name of Panchayath	Udayamperoor
Geographical Area	345 ha
Average Slope	5-10%
Length of Main stream	4kms
Name of Village	Manakunnam,Thekkumbhagom
Allotted amount(lacs)	41.4.

4.5. KUNNATHUNADU- THALAKKODE WATERSHED (13M 19d)

The latitudinal extension of the watershed is $9^{0}57'0"N$ to $9^{0}54'0"N$ and longitudinal $76^{0}22'30"E$ to $76^{0}24'45"E$. .The wards of the watershed are 1 to 14 wards of Chottanikkara gramapanchayath, Division 23 of Thripunithura municipality and Wards 10 and12, south to Thiruvaniyoor PWD road of Ward 11 of Thiruvaniyoor Panchayath. The total geographical area of the watershed is 1033 Ha and is the highest elevation area of the total project area.

4.5.1 General Information of the Watershed

Table.4.5:1 General Information of the Watershed.

Name of Watershed	Kunnathunadu- Thalakkode
Name of Village	Thiruvaniyoor,Kunayannur,Kureekad,Thiruvankulam
Name Of Panchayath/Municipality	Chottanikkara, Thiruvaniyoor, Thripunithura
Geographical Area	1033 ha
Length of Main stream	7.2kms
Watershed code	13M 8a
Average Slope	5-33%
Allotted amount(lacs)	123.96

4.6 VATTUKUNNU- KARINGACHIRA WATERSHED (13M 20a)

Vattukunnu-Karingachira watershed is located at Mulanthuruthy-Udayamperoor gramapanchayaths and Thripunithura Municipality of Eranakulam District. The water shed is lies in the 1, 2,3,12,13,15,16 wards, East to Panarthodu and West to Thalayolaparambu road of Ward 14 of Mulanthuruthy GramaPanchayath, Divisions 4,5,6,11,12,13,14,15,16,22,24,25 of Thripunithura municipality and Ward 4, East to Konothupuzha of Wards 5 and 3 of Udayamperoor GP. The latitudinal extension of the watershed is 9°48'33.393"N to 9°50'52.423"N and longitudinal extension 76°44'41.359"E to 76°46'33.048"E.

4.6 .1. General Information of the Watershed

Table.4.6.1 General Information of the Watershed.

Name of Watershed	**Vattukunnu- Karingachira**
Name of Village	Thiruvankulam,Kureekad,Kanayannur, Mankunnam,Mulanthuruthy
Name of Panchayath/Municipality	Mulanthuruthy,Thripunithura, Udayamperoor
Geographical Area	2331 ha
Watershed code	13M 20a
Average Slope	5-10%
Length of Main stream	12.5kms
Allotted amount(lacs)	279.72

CHAPTER IV
PROBLEMS TO BE ADRESSED

The treatment in a watershed depends on the specific problems faced by the area. The four micro watersheds in the project area face many common problems because of the similarities existing among the micro watersheds. In order to ensure that the benefits of the project reaches different sections of the population, particularly the vulnerable, the involvement of the community is essential right from the planning the project. The participation of the community, particularly the vulnerable sections of the society such as those living below poverty line, small and marginal farmers, women, landless families, SC/ST communities have been ensured in the identification of the problems. The major identified through PRA techniques in the IWMP II/2012-13 project are given below:

1. Acute drinking water shortage.
2. Degradation of land due to erosion.
3. Reduction in soil moisture content.
4. Lack of protection of streams.
5. Waste dumping into the water bodies.
6. Un renovated farm ponds.
7. Keeping paddy fields fallow
8. Lack of conservation measures for agricultural and non-agricultural lands.
9. Diminishing food crop production.
10. Insufficient milk production and service of milk co-operatives.
11. Lack of livelihood opportunities.
12. Complex procedure of banks to provide credit to farmers.
13. Other environmental issues.

To develop and manage the watershed, a set of interventions are suggested in detail in the next chapter.

CHAPTER V

WATERSHED INTERVENTIONS

6.1. Introduction

The major objective of Integrated Watershed Management Programme (IWMP) is to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water. The watershed approach would result in improving the productivity of not only agriculture but also the overall production of bio-mass for enhancement of self-employment opportunities and thus the overall income of the rural households. Based on the problems identified through participatory methods and the inputs from several rounds of discussions with stakeholders including experts, suitable interventions for watershed development of the project area have been identified. The specific interventions under IWMP are broadly classified into Information, Education & Communication (IEC) Activities, Entry Point Activities (EPA), Natural Resource Management (NRM) Production System and Microenterprises (PSM) and Livelihood Activities.

6.2. Information, Education & Communication (IEC)

Information, Education & Communication (IEC) is an important component and it has a vital role in creating awareness, mobilizing people and lays the basis for successful implementation of IWMP.

6.3.Entry Point Activities (EPA)

Entry Point Activities aim to mobilize the community in support of the subsequent interventions under the project. EPA helps to create rapport with the watershed community. Entry Point Activities are identified with a view to showcase them as model interventions which, in turn, would generate the interest of the community in watershed development activities. Community participation is essential to maximize the impact of the project and ensure the sustainability of the project out comes. Entry point activities identified in the project area are presented below:

(a). Protection and Renovation of Valiyakulam Pond Capacity

Based on the wish of the people and the resolution of the concerned nighbourhood groups and grama sabhas and the approval of the watershed Committee, the panchayath level Committee as well as the Block Panchayath Committee, it has been decided by the Mulanthuruthy Block Panchayath to go ahead with the renovation of Valiyakulam as Entry Point Activity under the IWMP project in the Ameda Watershed. Valiyakul;am is an important water resources for the

nighbouring community of Ameda watershed area. This pond is also containing a pumping house of Kerala Water Authority. So, this is an important source of drinking water supply of the area. Thus it is necessary to protect the pond as early as possible. Desiltation, Side protection and fixing shade net are the important work selected for the protection of the valiyakulam pond.

(b). Drinking water project –Kunnathunadu Thalakode microwatershed

Based on the wish of the people and the resolution of the concerned neighborhood groups and grama sabhas and the approval of the Watershed Committee, .it has been decided by the Mulanthuruthy Block Panchayath to go ahead with the Construction of Drinking water structure in Thalakodu Harijan Colony for alleviating drinking water scarcity Entry Point Activity under the IWMP project in the Kunnathunadu- Thalakode Microwatershed.The prescribed area under the EPA activity is facing a severe water crises problem during the major part of a year. The availability of drinking water worst in this area. So as a remedy to that, it is planned to construct a drinking water structure in that area. Constructing an overhead tank and distributing drinking water to the colony distribution lines and renovating the wells.

Table: Entry Point Activities-Location

SL NO	Activity	Micro-Watershed	Survey No	Panchayath	Ward No	Amount IWMP (in Lacs)	Converging Dept	Person /families Benefitted	Area Benefited (ha)	Total Amount (in lacs)
1	**Protection and renovation of Valiyakulm pond**	**Ameda Microwatershed**	362/9	**Udayamperoor**	**17**	**13.25**	**MGNREGS-1.75**	**125 ha**	**125 ha**	**15 lacs**
2	**Drinking water project**	**Kunnathunadu – Thalakodu Micro**	**187/3**	**Chottanikkara**	**7**	**5.1**	**-**	**100**	**40 ha**	**5.1 lacs**

6.4.Watershed Work Phase

The major activities in this phase are

I. Watershed Development Works or Natural Resource Management (NRM)
II. Livelihood Activities for the poor people
III. Production System and Microenterprises

The main watershed development development interventions are as follows;

6.4.1. Watershed Development Works/Natural Resource Management (NRM) Activities

Natural resource management aims to maintain and improve natural resource base. People in the project area depend upon agriculture and allied activities. Management of Natural resources helps to enhance livelihood of local community on a sustainable basis. The main NRM activities identified for the project area are as follows:

a) Open Well Recharging from Roof tops for Ground Water Recharge

The broad aim of the programme is to improve the ground water level of homestead open dug wells. This will contribute to enhanced health and welfare of the community through improved access to drinking water. The reduction of public spending on Tanker Water Distribution to the water stressed regions which is common during summer is also envisaged as a broader goal of the programme

b) Well Renovation

There are a large number of public wells in the project area and most of them are being utilised by the people. But due to improper maintenance a number of them are unhygienic. It is suggested that some of the public wells are renovate to make them usable.

c) Rooftop Rainwater Harvesting Ferrocement Tanks

Project area faces acute drinking water shortage. Most people use traditional water harvesting technique by using a clean cloth or clean plastic sheet for collection of water. At present, they can store water only for a few days. Large storage facility is essential to conserve water. One option to improve drinking water availability is to make use of water harvesting technique.The process involves collecting rainwater from roof catchments, passing it through the natural filter media and storing it in ferrocement tanks for drinking and other domestic purposes. So it is suggested that ferrocemnent tank may be allotted to households and installed in public places.

d) **Renovation/Desilting of Dugout Ponds (Embankment & Side Wall Protection)**

Ponds are considered as one of the important freshwater habitats and are useful for surface runoff harvesting and ground water recharging. It has an important role in maintaining the biodiversity of the area. Ponds in the project area are not maintained well. In the past, there were ponds in many homesteads. But later it got filled. Most of the public ponds are also facing degradation due to lack of proper maintenance. Silting and over growth of water hyacinth are the major problems. So removal of water hyacinth, desiltation and side wall protection is proposed. Removal of water hyacinth can be converged with MGNREGS

e)Rain Pits /Recharge Pits

Pits of appropriate dimensions are made at suitable locations in the watersheds for augmenting recharge of ground water through enhanced percolation of rain water. These pits may also be termed as rain pits. This is an intervention suitable for areas with moderate slopes. Plant Basins can also act as efficient recharge pits. Number and spacing of the pits shall be conducive to the land use in each holding. Rain pits are not recommended for areas with higher and for locations under water logging.

f) Mulching

Mulching can be done for in-situ conservation of soil moisture. Locally available materials like leaves, three branches or any suitable organic waste materials can be spread in thick layers on soil surface. Mulching will also help in the absorption of morning dew drops, thus enriching the soil moisture.

g) Side protection of Streams

Steams and water bodies have the supreme importance in the watershed management projects. Streams need sudden intervention methods like stream embankment and retaining wall constructions to protect it from the degradation. Since streams are the main source of water for irrigation purpose the must be protected.

h) Contour Earthen Bunds

This measure involves construction of horizontal lines of contour Earthen bunds across the sloping land surface. Contour Earthen bunding is practiced to intercept the runoff flowing down the slope by an embankment with either open or closed ends to conserve moisture as well as to reduce erosion. The land treatment in between the bunds is desirable for uniform conservation of moisture.

i) Culvert Construction

Our project area has a number of criss-crossing water channels and these are being blocked because of the unscientific construction of roads and foot paths without culverts. It leads to water logging and flood. So, sufficient number of culverts has to be constructed to ensure smooth flow of water and to avoid water logging

j) Sluices

This will help to control the entry of canal water to the thodu near paddy field. Sluices are essential for paddy cultivation.

h) **Construction of NewWell**

Certain region in Chottanikkara Grama Panchayat is facing acute drinking water shortage due to the lack of water storage/harvesting structure. So,a well has been recommended for the purpose of water storage /harvesting and recharging,

i) Centripetal Terraces

This is the practice of taking circular bunds around the bottom of tree like coconut. The bunds are made in such a way that the center portion of the bund is lowered and the outer portion is raised. Those bunds capture water from the tree and retained for a very long period and completely percolate to the soil very slowly.

6.4.2. Production System and Microenterprises

According to the Common Guidelines for Watershed Development Projects (2008), 10 per cent of the total project cost to be assigned to support the production system and micro enterprises. This component aims to (a) promote diversified production/farming system based livelihood activities/interventions (b) encourage farmers to adopt and upscale successful experiences of proven technologies, integrated farming systems and improved farming practices for livelihood augmentations.

The activies/interventions planned under this component are

a) Banana Cultivation

Banana cultivation is a promising activity for farmers in the light of new agricultural scenario. Banana has duel potential as a raw fruit and processed items such as Banana powder, chips and other associated products. The organic wastes available from the household if

composted can be used as manure for the crop. The existing waste land can be made productive through banana cultivation. For Kudumbsree units as well as self help groups, this is an appropriate income generation programme. One important point to be emphasized in the cultivation process is to minimize the use of chemical fertilizers and pesticides in the field. The focus should be on organic methods

b) Biomethanation plant

Biogas typically refers to a gas, produced by break down of organic matter in the absence of oxygen. Organic waste such as dead plant and animal material, animal feces and kitchen waste can be converted into gaseous fuel called bio gas. Biogas originates from biogenic material and is a type of bio fuel.

c) Milking Machine

A machine for the milking of cows, occasionally buffalos and rarely goats, it helps farmers to do the milking of animals. This has been recommended by farmers

d) Cow dung Pit Construction

There are a number of dairy farmers in having nominal land holdings to rear the cattle. It seem that there are no cow dung pits and are now dumping the cow dung in the nearby drainage channels which pollutes the environment. So, for proper disposal of the cow dung, it is suggested to construct cow dung pit for farmers. The cow dung converted into dried organic manure can be used for cultivation.

e) Chauff cutter

Chauff cutters are simple agriculture machine to cut the chauff / fodder so as to feed the animals in an easy way. This is recommended since farmers find it difficult to cut the fodder manually.

f) Cattle Shed.

Clean cattle sheds are indispensible for rendering the cattle- keeping a profitable and attractive venture. Hence this program envisages a plan to provide clean and hygienic cattle sheds to all those farmers who are involved in cattle keeping.

g) Vermi Composit

Vermi compost is the product or process of composting, using various species of earth worms to create mixture of decomposing vegetable or food waste, bedding material and vermin cast. Vermin castings contain reduced levels of contaminants and a higher saturation of nutrients. Vermin compost is an excellent,

nutrient rich organic fertilizer and soil conditioner.

h) Cow Pea Cultivation

Cowpea belongs to the family Leguminoseae. It is a twining annual herbaceous plant. Cowpea can be grown throughout the year under Kerala conditions. It can be grown as a floor crop in coconut gardens and as an intercrop in tapioca during May-Sept. Cowpea can be grown in homestead garden throughout the year and in kole lands of Mulanthuruthy during summer where rice crop cannot be raised due to water scarcity.

i) Grow bag distribution

Vegetable cultivation is an easy job for those who are interested. A variety of vegetables could be cultivated either in rooftops, carry bags, back yards or in pots. It could also be upgraded to commercial level. People could cultivate them on group basis also on lease land or on own lands. Vegetable cultivation is also an important activity to conserve our traditional varieties of vegetables. Promotion of vegetable cultivation is an important component in the programme

6.4.3. Livelihood Support

The Common guidelines for Watershed Development Projects (2008) gives priority to livelihood support for landless/asset less persons. Nine per cent of the total project cost is assigned to support the livelihood activities of landless/asset less households. This aims to maximize the utilization of potential generated by watershed activities and in creating sustainable livelihoods for households within the watershed area.

The guiding principles for livelihood improvement initiatives are:

1. Livelihoods improvements initiatives emphasize on natural resource based activities and conform to principles of equity, gender sensitivity and transparency. It strives to:-
   a) Enhance livelihood opportunities for the poor through investment into asset creation and improvement in productivity and income.
   b) Improve access of the marginalized communities including SC/ST, landless/asset less people, women etc to the benefits.
   c) Select the beneficiaries in a transparent manner.
2. Livelihood initiatives for landless/asset less households should aim at improved household income, participation and division of labor, access to information, knowledge, appropriate technologies and resources.

   The activities/interventions related to livelihood improvement suggested for the project area are as follows.

a) Poultry Farm and Duck rearing

Poultry farming and Duck Rearing is the raising of domesticated chickens and duck, for the purpose of meat or eggs for food. The manure from poultry can be used to manure crops. Poultry & duck rearing does not require much infrastructure facilities. Back yard Poultry or duck rearingis identified as a potential livelihood for the poor housekols in the project area. Interested Self Help Groups can be motivated to take up small poultry units under this project. Groups consisting of members from landless, SC/ST, OBC, BPL etc categories shall get preference in the process of selecting eligible Groups

b) Goat Rearing

Goat farming is an important component in dry land farming system. It is one of the techniques to improve the economy of rural farming community. Hybrid goat rearing has been found to be highly remunerative, compared to rearing other farm animals, and it is advocated as a better substitute of livelihood for the rural poor.

c) Fish Processing

Food drying is one of the oldest methods of preserving food for later use. The fish can be cleaned, dried with salt, and packed at the village level and fetch better price in the market.

d) **Mushroom Cultivation**

Mushroom has a good overseas market, in which the present contribution of India is negligible. In the domestic market the availability of mushroom is limited to cities and big towns only. Mushrooms can be marketed either fresh or after dehydration. There is huge international demand for dried mushroom. Mushroom has good nutritional potential and has wider acceptance in markets.

e) Bee Keeping

Honey bee farming is a great way to reduce unemployment in rural areas. This also increases the availability of pure and natural honey. Incorporating honey bee farming in current farming is always a sustainable method of farming. Honey bee farming in rubber plantations increases the income from rubber plantations by spending small amount of money and time. Rubber trees are

great source of honey. Various Government agencies like Rubber Board, National Horticulture Board, NABARD, Khaddi Board etc give training and assistance to promote bee keeping.

f) **Adukkalathottam**

Keralites are fully depending on other states for vegetables. These vegetables that arrive from the neighboring states are highly contaminated with toxic compounds through the pesticide applications. As a result, the Keralites are increasingly getting affectedwith diseases. Though Kerala is blessed with suitable environment (rich soil, availability of water, prolonged monsoon, etc) for the production of many vegetables, there is an apparent lacking of interest among people to cultivate vegetables. Vegetable cultivation is an easy job for those who are interested.

A variety of vegetables could be cultivated either in rooftops, carry bags, back yards or in pots. It could also be upgraded to commercial level. People could cultivate them on group basis also on lease land or on own lands. Vegetable cultivation is also an important activity to conserve our traditional varieties of vegetables. Promotion of vegetable cultivation is an important component in the programme.

g) Rabbit Rearing

Rabbit rearing is turning out to be a very lucrative entreprise now as the demand for rabbit meat is ever in the increase. EligibleSelf-Help Groups identified on the basis of performance grading and ranking can be given assistance under this project asper provisions in the guidelines.

h) **Nursery Formation of Fruit and Spices Plants:**

Formation of a nursery is suggested to produce seedlings of various plants like coconut, spices, mango, jack, medicinal plants etc. It directly helps to improve the vegetative cover of the project area.

i) Cage Fish Farming

Vembanad Lake is very useful for this type of fish farming. Cages are being made by nylon net and are placed in lakes/bayous/ponds/rivers to contain and protect fish until they can be harvested. Groups and personnel can venture into this with the technical help of Fisheries department and IWMP can do the financial backing.

6.4.4.Sustainable Management Practices for Watershed Area

Micro watershed management involves integrating people,land and water.Management practices aims at long term well being of the local community. Following are some of the micro watershed management practices suggested for the project area:

- **a.** Regular maintenance of ponds, wells and drainages
- **b.** Prevent dumping of waste into water bodies.
- **c.** Manage waste in home by using bio gas plants etc.
- **d.** Install and maintain rain water harvesting structures and harvest maximum rain water using filtered tanks.
- **e.** Regularly clean the rainwater harvesting structures to ensure purity of drinking water. Also ensure that stored rain water is not contaminated.
- **f.** Plant trees and preserve existing trees and shrubs to prevent soil erosion.
- **g.** Do not spray pesticides indiscriminately.
- **h.** Increase the waterstorage in waterbodies.

CHAPTER VI

EXPECTED OUTCOMES

6.1 Expected Outcomes

The expected outcomes of the IWMP project are detailed below:

Table 6.1: Expected Outcomes

Intervention area	Activities	Out Come
Soil and moisture Conservation	Adoption of suitable soil and moisture conservation measures like earthen bunds, mulching, CPT, stream bank protection.	Rain water will be conserved to recharge ground water level valuable top soil sources in about 1200 ha of land will be protected from erosion
Water harvesting structure	Well recharge Pond protection ,well renovation, rain water harvesting tank, rain pits	Water conservation is about 1530 ha of the project area problem of drinking water in the watershed area gets solved sustainably. 1.2 lakh m3 of rain water will be additionally collected in the project area water table will be increased about 3m height.
Paddy field	Culvert	10 ha of water logged paddy field is use full for cultivation
Energy and agri Extension Supporting Activities	Compost Pits – 19 no's Biogas plants – 20 no's	Organic manure at a rate of about 1900 tons per year can be additionally produced in the area Promotion of non conventional energy for daily cooking needs
Agri & Horticulture	Additional area under cultivation Banana cultivation-29 ha Tapioca cultivation-8 ha Cow Pea Cultivation-11 ha Ginger-4 ha Supply of grow bags:388 Increase in the Clean and strong cattle shed Increase	Organic crop production from an extent of about 52 ha of the watershed area ca livestock population shall be increased n be enhanced substantially and additional cattle sheds will be maintained. Rise in production of, milk, fish catch, eggs, vegetables etc .(Fodder cultivation in 42 acrse will help to yield 5% more milk from milching animal 53 Ha more vegetable cultivation will ensure more availability, 71 cage units will give atleast 9000 Kg of fish per year, buffalo calves will increase beef and milk availability
Livelihood Activities	Micro enterprises development in the watershed areas	1. 95 SHGs will get aid for strengthening their livelihood activities in every year. 2. Generate employment opportunities for minimum 450 people every year. 3. Empowerment of land less, asset less poor people. especially women who are home makers without having any monetory benefit. Through the seed money they can earn Rs.2000 Per month).

EXIT PROTOCOL

6.2..Watershed Development Fund and Exit protocol

The main source of financial assistance for the post implementation period is Watershed Development Fund (**WDF**). One of the mandatory conditions for the selection of villages for watershed projects is people's contribution towards WDF. The Contribution to WDF shall be a minimum 10 % of the cost of NRM works executed on private land only. However, in case of SC/ST, small and marginal farmers, the minimum contribution shall be 5 % of cost of NRM works executed on their land. These contributions would be acceptable either in cash at the time of execution of works or voluntary labour. A sum equivalent to the monetary value of the voluntary labour would be transferred from the watershed project account to the WDF bank account that will be distinct from the Watershed Committee (WC) bank account. User charges, sales proceeds and other contributions, disposal amounts of intermediate usufruct rights shall also be deposited in the WDF bank account. Income earned from assets created under the project on common property resources shall also be credited to WDF. For other cost intensive farming system based livelihood activities/interventions such as Aquaculture, Horticulture, Agro Forestry, Animal Husbandry etc. on private land directly benefiting the individual farmers, the contribution of farmers will be 20 percent for general category and 10 percent for SC/ST beneficiaries and the project funds will meet the cost of farming system activity to a maximum limit of an amount equal to double of the unit cost of the project for watershed development (i.e. Rs 12,000 per ha, as the case may be). Farmers' contribution i.e. 20 percent for general category and 10 percent for SC/ST of this amount (i.e. a maximum of Rs 4800/6000 and Rs 2400/3000 as the case may be, respectively for general category and SC/ST beneficiaries) will go to WDF. The Secretary, Watershed Committee (WC) shall maintain a completely separate account of the income and expenditure of the WDF. Rules for operation of the fund should be prepared by the Watershed Committee (WC) and ratified by the neethada Gram Sabha. The WDF bank account should be operated by the President of the Gram Panchayath and any member from the SHG nominated by the Gram Sabha. Alternatively, the guidelines for the management and utilization of the WDF may be evolved by the concerned Nodal Ministry. After completion of Phase II, at

least 50% of the WDF funds shall be reserved for maintenance of assets created on community land or for common use under the project. Works taken up on private land shall not be eligible for repairing/ maintenance out of this Fund. The remaining money may be used as a revolving fund to advance loans to the villagers of the project area who have contributed to the fund. Individuals as well as charitable institutions should be encouraged to contribute generously to this Fund.

CONCLUSION

Watershed development approach has been advocated as the best strategy for conserving the natural resource of water, soil and bio-mass. A watershed is a natural unit of sustainable development. Eleventh Five Year Plan has proposed Watershed management activities for ensuring rural development. Watershed approach aims at augmentation and stabilization of production and productivity, minimizing the ecological degradation and generating and maintaining sustainable rural development in rain-fed areas. It was in this context that Govt. of India decided to implement watershed development projects in the distressed districts in India.

The IWMP-2/2011-12 project, comprising four micro watershed and covering four Gramapanchayath and one municipality in a total of 3812 Ha in Mulamthuruthy Block Panchayath in the Western Ghats region, is inhabited by a total population of 77944 people, mostly of small and marginal farmers. Mulamthuruthy Block Panchayath has been selected as the Implementing Agency of this project. As a prelude to the implementation phase of the project with a view to preparing the Detailed Project Report, a feasibility study has been conducted.

The solution identified include building up the natural resource base through interventions in the areas of soil and water conservation, bio-mass improvement through agro-forestry, promotion of improved agronomic practices, livelihood support, women development programs, capacity building and so forth. With this as a solid base, we are proposing a plan including construction of earthen bunds, construction and renovation of farm pond, roof water harvesting structures, stream protection, farm land protection, paddy land protection, mulching, crescent bunding / CPTs, renovation and construction of check dams, renovation of water sources through stream embankment, promotion of livestock rearing, and so forth. These inputs are calculated to lead to positive outcomes, such as improvement in water availability, arresting of soil erosion, improvement in farm incomes, food fodder and medicines made available, improvement in the status of women human resource development of the watershed community, reduction in poverty and indebtedness, improved economic security and ecological balance and so forth.

The project has high sustainability in terms of technology, it project will promote low cost, long lasting methods capable of protecting the natural resources of soil, water and biomass;

institutionally because involvement and participation of the stakeholders, ensuring the equitable distribution of the project benefits; financially, since by promoting various production management system, livelihood support system and efficient management system, financial sustainability can be achieved and environmentally, because natural resource management, the core of environmental sustainability, will be ensured through suitable natural resource conservation measures, promotion of organic farming, farm forestry, a forestation and reforestation.

APPENDIEES

CONSOLIDATED ACTION PLAN- CB AND IEC (in Lakhs)

I	**Information, Education & communication (IEC) Activities in the project area**													**7.872**
ii	**Total Budget Planned for Capacity Building**													**15**
11	**Capacity Building Programme**	**Target group**	**Year I**		**Year II**		**Year III**		**Year IV**		**Year V**		**Total**	
			Phy	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**
1	Awareness programme of IWMP, Roles & responsibilites	WC Members,Watershed community, user groups, farmers, officials, GP leaders, SHG Members etc	8	.58	4	.29	6	.435	5	.3625	5	.3625	28	2.03
2	Awareness programme of PSM	User groups,Farmers, SHG members	4	.29	4	.29	4	.29	4	.29	4	.29	20	1.45
3	Awareness programme on water lieracy/ground water recharging, rain water harvesting	User groups,FarmersSHG MembersNREGS Mates	4	.29	6	.435	6	.435	6	.435	6	.435	28	2.03
4	Workshops about Convergence possibilities and watershed development, Roles and responsibilities in watershed management and Record maintance	Officials (VEO's) WC members, Watershed communityJLG members, Gramapanchayath members etc.	4	.29	4	.29	4	.29	4	.29	4	.29	20	1.45
5	Awareness programme on livelihood activities and better management-eg:- zero budget natural farming,Organinc farming etc	JLG groups,User groups, Farmers etc	6	.435	4	.29	4	.29	4	.29	4	.29	22	1.595
6	Management of revolving fund, account methods, financial discipline etc	SHG,s,JLG,s,User groups Water shed committee members	4	.29	6	.435	4	.29	4	.29	4	.29	22	1.595
7	Promotion of micro enterprises and value addition units and marketing etc	SHG,s,JLG,s, User groups Farmers	4	.29	3	.2175	5	.3625	4	.29	4	.29	20	1.45
8	Animal husbandry & Better management of livestock, etc	SHG,s,JLG,s, User groups Farmers	3	.2175	4	.29	4	.29	4	.29	4	.29	19	1.3775
9	Important day celeberation	Community ,school children, user groups,SHG,s, JLG,s	4	.3175	6	.4625	4	.3175	6	4625	6	.4625	26	2.0225
Total			**41**	**3**	**41**	**3**	**41**	**3**	**41**	**3**	**41**	**3**	**205**	**15**

INFORMATION, EDUCATION, `COMMUNICATION ACTIVITIES

Total Budget Planned for IEC:787200								
SLNO	**SUBJECT TITLE**	**Target group**	**Year I**	**Year II**	**Year III**	**Year IV**	**Year V**	**Total**
1	Watershed awareness programme through school children	School Level	30000	30000	30000	30000	30000	150000
2	Road shows of watershed, exposure visit,	Public, farmers	60000	60000	60000	60000	60000	300000
3	Campaign through poster, stickers, banner, calendars, etc.	community	300000	300000	300000	300000	300000	150000
4	Hand Books, Brochure	community	17440	17440	17440	17440	17440	87200
5	Quiz programme, competition and mela	Students, youths, clubs	20000	20000	20000	20000	20000	100000
	TOTAL		**157440**	**157440**	**157440**	**157440**	**157440**	**787200**

CONSOLIDATED ACTION PLAN NRM

WATERSHED WISE ANNUAL ACTION PLAN						
	_	**Estimated cost (Rs.in lakhs)**				
Sl.No	**Micro Watershed**	**1st year**	**2nd year**	**3rd year**	**4th year**	**TOTAL**
1	Puthiyakavu	3 .1216	3 .8	_	_	6 .9216
2	Ameda	5 .63	6	5 .8	5 .754	23 .184
3	Kunnathunadu - Thalakkodu	17 .1676	17 .25	17 .5	17 .5	69 .4176
4	Vattakkunnu-Karingachira	38.89	39 .5	38 .6	39 .6532	156 .6432
	TOTAL	**64.8092**	**66.55**	**61.9**	**62.9072**	**256.1664**

PUTHIYAKAVU WATERSHED
FIRST YEAR

Sl. No.	Name of Work	Measurements (in Metre)	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in lakhs)	Convergence Details				No. person/Area Benefitted	Survey No
							Activity	Measure. /Rate	Estimate Amount	Dept.		
1	Renovation of public well		1 no		0.4216	0.4216					25 nos.	
2	Renovation and Desiltation of Kadavil Thrikkovil kulam in ward 19 of Udayamperoor G.P.	65X0.9X2	1 no	2374/m3	2.7708	2.7	Site Clearing and Desiltation and geo tex.	94M3	0.0708	MGNREGS	20 famalies	
	TOTAL					**3.12**						

SECOND YEAR

Sl. No.	Name of Work	Measurements (in Metre)	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in lakhs)	Convergence Details				No. person/Area Benefitted	Survey No
							Activity	Measure. /Rate	Estimate Amount	Dept.		
1	Side protection ofAthazhappil thodu in ward 20 of Udayamperoor	100X0.8X1.8	1 no	2680/m3	3.8602	3.8	Site Clearing and Desiltation	80M3	0.0602	MGNREGS	31ha	307/3
	TOTAL					**3.8**						

Ameda watershed												
FIRST YEAR												
Sl. No.	**Name of Work**	**Measurements in Metre**	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/Area Benefitted**	**Survey No.**
							Activity	**Measure. /Rate**	**Estimate Amount**	**Dept.**		
1	Rennovation of Public Well	2m dia	1 nos.	0.41/E	0.41	0.41	_	_	_	_	50nos.	_
2	CPT	3m dia	84 NOS,	119	0.1	0.1	_	_	_	_	4 ha.	_
3	Mulching	3m dia	53	188	0.1	0.1		_	_	_	4 ha.	_
4	Roof top Rain water harvesting Ferro cement Tank	25000 litre	1 nos	6/lit	1.5	1.5	_	_	_	_	70 students	_
5	Well Recharge	_	4 nos	12100	0.484	0.484	_	_	_	_	25 nos.	_
6	Side Protection of stream-Veluthedathu thodu Protection in ward-16 of udayamperoor	80x0.7x2	1 no.	2711/m3	3.0721	3.036	Site Clearing and Desiltation	48m3	0.0361	MGNREGS	25ha	330/9 ,350/5
	TOTAL					**5.63**						

	SECOND YEAR											
Sl. No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund	Convergence Details				No. person/Area Benefitted	**Survey No.**
							Activity	Measure. /Rate	Estimate Amount	Dept.		
1	Side Protection of Puthezhathu-Karuruthythodu in ward 6 of Udayamperoor panchayath	240x0.6x1.5	1 no	2803/m3	6.0541	6	Site Clearing and Desiltation	70m3	0.0541	MGNREGS	50ha.	396/8
	TOTAL					**6**						

	THIRD YEAR											
Sl. No.	**Name of Work**	**Measurements in Metre**	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/Area Benefitted**	**Survey No.**
							Activity	Measure. /Rate	Estimate Amount	Dept.		
1	Side protection and cleaning of Kuthukallingal thodu ward 5 of udayamperoor panchayath	240x0.55x0.8	1 no	3799/m3	4.027	4	Site Clearing and Desiltation	36m3	0.027	MGNREGS	33 ha.	188/32
2	Side protection of morvelli thodu in ward 18 of Udayamperoor	80x0.65x1.5	1 no	2387/m3	1.8624	1.8	Site Clearing and Desiltation	80m3	0.0624	MGNREGS	15ha.	301/16
	TOTAL					**5.8**						

FORTH YEAR												
Sl. No.	**Name of Work**	**Measurements in Metre**	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/Area Benefitted**	**Survey No.**
							Activity	**Measure. /Rate**	**Estimate Amount**	**Dept.**		
1	Side protection morvelli thodu in ward 18 of Udayamperoor	120x0.65x1.5	1 no	2387/m3	2.754	2.754	_	_	_	_	23 ha.	301/16
2	Side protection ofAmeda Kalizhathu thodu in ward 16 of Udayamperoor	122x0.7x1.8	1 no	1966/m3	3.0279	3	Site Clearing and Desiltation	38m3	0.0279	MGNREGS	25 ha.	325/15
	TOTAL					**5.754**						

Kunnathunadu-Thalakodu Watershed
FIRST YEAR

Sl.No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount	IWMP Fund	Convergence Details				No. person/ Area Benefitted	Survey No.
					In lacs	In lacs	Activity	Measurement /Rate	Estimate Amount	Dept.		
1	Renovation of public well	3m dia	5nos.	40000/E	2	2	_	_	_	_	14ha	–
2	Rain Pits	1x1x1	497 nos.	126	0.568	0.5	Rain pits	68/each	0.068	mgnregs	4.6 ha	–
3	CPT	3m dia	560 nos.	119	0.558	0.5	CPT	58/each	0.058	MGNREGS	4.6 ha	–
4	Mulching	3m dia	265 nos.	188	0.5	0.5	_	_	_	_	4 ha	–
5	Earthen bunds	0.5x0.45x1.1	1000 m	86/m	0.7855	0.5176	Earthen bunds	64/m	0.2679	MGNREGS	6.3 ha	–
6	well recharging	_	18 nos	12000/E	2.15	2.15	_	_	_	_	20ha	–
7	Side Protection of streams- OEN-Kuppethazhamthodu	70x0.75x2.3	1 no.	2083/m3	2.526	2.5	Deseltin g & site clearing	35 m3	0.0264	MGNREGS	20ha	114/41 , 113/41
8	Renovation and Desiltation of Dug out FarmPond Kaveleswaram kulam-23 of Tripunithura Municipality	100x0.9x1.8	1 no.	1852/m3	3	3	_	_	_	_	25ha.	570/8
9	Renovation and Desiltation of Dug out FarmPond kalukulam in ward-6 of chottanikkara panchayath	55x1x3.5	1 no.	2916/m3	5.619	5.5	Deseltin g & site clearing	225m3	0.169	MGNREGS	52ha.	149/1
	TOTAL					**17.1676**						

SECOND YEAR												
Sl. No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in Lakhs)	Convergence Details				No. person/ Area Benefitted	Survey No.
							Activity	Measurement /Rate	Estimate Amount	Dept.		
1	Rain pits	1x1x1	298 nos.	126/E	0.318	0.25	rain pits	68	0.068	Mgnregs	3ha	
2	Renovation of public well	3m dia	9 nos.	55600/E	5	5	_	_	_	_	50ha	
3	Side Protection Karumamkulam thodu in ward 1 of chottanikkara	1000x1x0.4	1 no.	1340/10m3	1.301	1	Deselting & side protection	400 m3	0.301	MGNREGS	40 ha	22/2,22/4, 15/1, 15/6
4	Side Protection of Kariyelipadamthodu ward 2 of Chottanikkara Grama Panchayath	55x1x3	1 no.	2424/m3	4.026	4	Deselting & side protection	35m3	0.026	MGNREGS	35ha	
5	Construction of well in ward 3 Chottanikkara Gramapanchayath		1 no.		7	7	_	_	_	_	60 ha.	
	TOTAL					**17.25**						

THIRD YEAR												
Sl.No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in lakhs)	Convergence Details				No. person/Area Benefitte	Survey No.
							Activity	Measure. /Rate	Estimate Amount	Dept.		
1	Side Protection of Chandaparamb -Pamba -Kannengery thodu in ward 13 of ChottanikkaraG P .	220x0.7x1.5	1 no.	2623/m3	6.0603	6	Deselting & site clearing	80m3	0.0603	MGNREGS	50 ha.	90/1
2	Renovation and Desiltation of Dug out FarmPond Vellamkuzhichikkulam in ward 11 of ChottanikkaraG P .	55x1.5x3	1 no.	2025/m3	5.0603	5	Deselting & site clearing	80m3	0.0603	MGNREGS	36 ha.	159/4
3	Renovation and Desiltation of Dug out FarmPond Valiyakulam ward 5 of Chottanikkara G .P .	55x1.5x3	1 no.	2025/m3	5.0603	5	Deselting & site clearing	80m3	0.0603	MGNREGS	35 ha.	286/9
4	Side Protection of Thannachira Edasserymattom todu in ward10 of Chottanikkara G P .	80x0.7x1.8	1 no.	1630/m3	1.5301	1.5	Deselting & site clearing	40m3	0.0301	MGNREGS	11 ha.	88/4,110/2, 78/11, 80/6
	TOTAL					**17.5**						

FOURTH YEAR												
Sl.No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in lakhs)	Convergence Details				No. person /Area Benefitted	Survey No.
							Activity	Measurement /Rate	Estimate Amount	Dept.		
1	Side Protection of Thannachira Edasserymattom todu in ward10 of Chottanikkara G P .	120x0.7x1.8	1 no.	1630/m3	3.5303	3.5	Deselting & site clearing	40m3	0.0301	MGNREGS	30 ha.	88/4, 110/2, 78/11, 80/6
2	Side Protection ofChakkalakkelthazham - Katteppadam thodu in ward10 ofThiruvaniyoor G P .	70x0.75x2.3	1 no.	2033/m3	2.533	2.5	Deselting & site clearing	45m3	0.033	MGNREGS	22 ha	244/13
3	Side Protection of Adiyakkel thodu in ward4 of Chottanikkara G.P.	20x1.5x3	1 no.	2070/m3	2.1	2	site clearing	40m2	0.008	MGNREGS	18 ha.	253/12
4	Side Protection of Akkal paddy field thodu and culvert construction in ward9 of Chottanikkara G.P.	300x0.6x0.8	1 no.	3472/m3	5.035	5	site clearing	45m3	0.035	MGNREGS	35ha.	94/1
5	Side Protection ofVllathadam-Kuppethazham thodu in ward11 ofThiruvaniyoor G P .	120x0.65x0.8	1 no.	2343/m3	1.7	1.5	Deselting & site clearing	40m3	301	MGNREGS	13ha.	159/2
6	Side Protection ofChoozhathippadam thodu and sluice in ward13 of Chottanikkara G.P.	122x0.7x1.8	1 no.	1960/m3	3.0303	3	Deselting & site clearing	40m3	0.0303	MGNREGS	30 ha	123/7, 123/8
	TOTAL					**17.5**						

VATTAKUNNU-KARINGACHIRA WATERSHED

FIRST YEAR

Sl. No.	Name of Work	Measurements in Metre	Unit	Rate	Estimate Amount (in lakhs)	IWMP Fund (in lakhs)	Convergence Details				No. person/Area Benefitted	Survey No.
							Activity	Measurement /Rate	Estimate Amount	Dept.		
1	Renovation of public well	3 m dia	11 nos	0.545/E	6	6	_	_	_	_	50ha	_
2	Rain pits	1x1.5x0.75	400 nos.	166/each	0.628	0.5	Rain pits	100 nos.	0.128	MGNREGS	10 ha.	_
3	C P T	3 m dia	500 nos	119/each	0.513	0.39	C P T	211	0.12	,,	4 ha.	_
4	Mulching	3 m dia		189/each	0.5	0.5					4 ha.	_
5	Roof top Rain water harvesting Ferro cement Tank	75000 lit.	1 no.	7/lit	6	6	_	_	_	MGNREGS	800 students	
6	Earthen Bunds	0.5x0.45x1.1	2000 m	132/m	2.045	1.5	Soil erosion bloking bunds	0.5x0.45 x1.1	0.554		17 ha	_
7	Well Recharge	_	33 nos.	_	4	4	_	_	_	_	100 nos	_
8	Side Protection of Chamakkalamthazham thodu in ward 12 of Mulanthuruthy G. P.	200x0.9x1.8	1 no.	1554/m3	5.0339	5	Site clearing desilting	45m3	0.0339	MGNREGS	41ha	175/15
9	Side Protection of Potteppadam thodu in ward 13 of Mulanthuruthy G. P	200x0.9x1.8	1 no.	1554/m3	5.0339	5	Site clearing desilting	45m3	0.0339		41ha	238/2
10	Renovation and Desiltation of Dug out FarmPond Cheruvattakkulam in ward 13 of Mulanthuruthy G.P.	20x2x4.5	1 no.	1667/m3	3	3	_	_	_	_	25 ha.	24/26
11	Construction of Embankment Type Dugout Farm pond in ward 13 of Mulanthuruthy G. P	4x4x5	1 no.	3750/m3	3	3	_	_	_	_	25 ha.	237/4
12	Renovation and Desiltation of Dug out FarmPond Kurumbankavil kulam in ward 4 of Udayamperoor G. P	45x1.6x3.5	1 no.	1829/m3	4.061	4	Site clearing desilting	80m3	0.061	MGNREGS	33 ha.	114/3, 114/4, 94/2
	TOTAL					**38.89**						

SECOND YEAR												
Sl. No.	**Name of Work**	Measurements in Metre	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/ Area Benefitted**	**Survey No.**
							Activity	**Measure. /Rate**	**Estimate Amount**	**Dept.**		
1	Earthen Bunds	0.5x0.45x1.1	1500 m	132/m	3.054	2.5	Earthen Bunds	1500m	0.554	MGNREGS	20 ha	
2	Side Protection of Kolenchery kadav thodu in ward1&16 of Mulanthuruthy G. P.	600x0.9x1.8	1 no.	1544/m3	15.121	15	Site clearing & desilting	160m3	0.121	MGNREGS	125ha	128/29
3	Renovation and Desiltation of Dug out FarmPond Padappanchira kulam in ward2 of Mulanthuruthy G. P.	90x1.7x3.5	1 no.	1579/m3	8.534	8	Site clearing & desilting	709m3	0.534	MGNREGS	60 ha	80/5
4	Side Protection ofHill Palace Museum thod in Division 14 of Thripoonithara Municippality	240x0.7x1.8	1 no.	1987/m3	6	6	_	_	_	_	35ha	323/12
5	Renovation and Desiltation of Dug out FarmPond Parakkadav kulam in Division 4 of Thripoonithara Municipality	100x0.9x2.05	1 no.	2168/m3	4	4	_	_	_	_	30ha	38/9
7	Well Recharge	_	33 nos.	12000/E	4	4	_	_	_	_	100 nos	_
	TOTAL					**39.5**						

THIRD YEAR												
Sl. No.	**Name of Work**	**Measurements in Metre**	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/ Area Benefitted**	**Survey No.**
							Activity	**Measure./ Rate**	**Estimate Amount**	**Dept.**		
1	Side Protection of Kooliyatt - Mattathan kadav thodu in ward14 of Mulanthuruthy G. P.	300x0.9x1.8	1 no.	1440/m3	7.051	7	Site clearing & desilting	68m3	0.051	MGNREGS	55ha	304/9 ,344/5
2	Culvert construction in Kalezheth - Osanavally thod inward15 of Mulanthuruthy G. P.	65m3	1 no.	121/10dm3	4.061	4	Site clearing & desilting	45m3	0.061	MGNREGS	30ha	279/3
3	Side protection of puthussery thoduin Div -11 of thripunithura municipality	240x0.9x1.8	1 no.	1546/m3	6	6	_	_	_	_	40ha	148/6
4	Side protection Thamarachal thodu near house of joy Div-13 Thripunithura municipality	100x1 x2.1	1 no.	1895/m3	4	4	_	_	_	_	30ha	277/5
5	Side protection of cherapuram thodu in Div-16 of Thripunithura Municipality	300x0.7x1.2	1 no.	1985/m3	5	5	_	_	_	_	35ha	260/7
6	Side protection of Changaputha thodu Div-22 of Thripunithura Municipality	240x0.8x1.8	1 no.	1736/m3	6	6	_	_	_	_	40ha	445/6
7	Renovation and Desiltation of Dug out FarmPond Paroopparambu Govt Pond side wall construction Div-5 of Thripunithura municipality	90x1x2	1 no.	3611/m3	6.6	6.6	_	_	_	_	40ha	171/8
	TOTAL					**38.6**						

FOURTH YEAR												
Sl. No.	**Name of Work**	**Measurements in Metre**	**Unit**	**Rate**	**Estimate Amount (in lakhs)**	**IWMP Fund (in lakhs)**	**Convergence Details**				**No. person/ Area Benefitte**	**Survey No.**
							Activity	**Measurement /Rate**	**Estimate Amount**	**Dept.**		
1	Side Protection of Kolerathil Thode ward 3 of Udayemperoor G P	120x0.65x1.5	1 no.	2387/m3	2.754	2.754	_	_	_	_	23 ha.	83/15
2	Renovation and Desiltation of Dug out FarmPond Kayikulam in Div.12 of thripunithura municipality	70x1.3x3.4	1 no.	1942/m3	6	6	_	_	_	_	50ha	241/8
3	Renovation and Desiltation of Dug out FarmPond Thiruvankulam temple pond Division 24 of Thripoonithara Municipality	90x1.1x3.5	1 no.	2312/m3	8	8	_	_	_	_	70ha	530/6
4	Renovation and Desiltation of Dug out FarmPond Kunnapilly kulam in Div-25 of Thripunithura	70x1.3x3.4	1 no.	1942/m3	6	6	_	_	_	_	50ha	441/6
5	Side protection ofAmarikkara thodu in Div-15 of Thripunithura	240x0.9x1.8	1 no.	2062/m3	8	8	_	_	_	_	70ha	394/4
6	Side Protection of Kolenchery kadav thodu in ward1&16 of Mulanthuruthy G. P.	200x0.9x1.8	1 no.	1543/m3	5.033	5	Site clearing de silting	45m3	0.033	MGNREGS	40ha	128/29
7	Well Recharge	_	33 nos.	1200/E	3.9532	3.9532	_	_	_	_	33ha	_
	TOTAL					**39.6532**						

CONSOLIDATED ACTION PLAN-PRODUCTION SYSTEM & MICROENTERPRISES

SLNO	Activities	Unit (ha)	Expected WDF maximum	Year I		Year II		Year III		Year IV		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Banana cultivation	29 ha	1.17	7 ha	1.68	8 ha	1.92	7 ha	1.68	7 ha	1.68	29 ha	6.96
2	Cow pea cultivation	11ha	.408	2 ha	.48	3 ha	.72	3 ha	.72	3 ha	.72	11 ha	2.64
3	Tapioca cultivation	8 ha	.336	2 ha	.48	2 ha	.48	2 ha	.48	2 ha	.48	8 ha	1.92
4	Ginger cultivation	4 ha	.192	1 ha	.24	1 ha	.24	1 ha	.24	1 ha	.24	4 ha	.96
5	Ornamental Gardening	2 nos	.096	-	-	-	-	1 no's	.24	1 no's	.24	2 no's	.48
6	Cattle shed construction	17no's	.648	4 no's	.960	5 no's	1.2	4 no's	.960	4 no's	.960	17no's	4.080
7	Chauff cutter distribution	61no's	1.220	14no's	1.40	16no's	1.6		1.5	16 no's	1.6	61no's	6.1
8	Milking machine distribution	39 no's	.808	8 no's	.80	10no's	1	10 no's	1	11nos	1.1	39no's	3.9
9	Cow dung pit construction.	74 no's	1.48	18 no's	1.8	19 no's	1.9	18 no's	1.8	19nos	1.9	74 no's	7.4
10	Supply grow bag	388 units	.388	90 unit	.45	69 unit	.345	112 unit	.56	117 unit	.585	388 unit	1.94
11	Biomethanation Plants	20 no's	.72	4 no's	.96	6 no's	1.44	5 no's	1.2	5 no's	1.2	20 no's	4.8
12	Vermin Composite unit	19 no's	.696	5 no's	1.2	4 no's	.96	6 no's	1.44	4 no's	.96	19 no's	4.56
	Total		**8.168**		**10.45**		**11.805**		**11.82**		**11.665**		**45.74**

CONSOLIDATED ACTION PLAN LIVELI HOOD (Seed money 70% 29,15244)

SL NO	Implementig Agency	Grama Panchayath	Watershed Name	Name of Scheme	Total amount for Scheme	Project Amount (Seed Money)	Beneficiaries Contributions	Bank Loan	I st Phase No of JLG.	II nd Phase No of JLG
1	Mulanthurtuhy Block Panchayath	Udayamperoor	-Ameda	Poultry(5*25000)	125000	110000	15000	NIL	_	5
2				Goat(4*50000)	200000	100000	100000	nil	4	_
3				Fish Processing 2*25000	50000	44000	6000	NIL	2	_
4				**Total(11 group)**	**375000**	**254000**	**121000**	**nil**	6	5
5		Udayamperoor	Puthiyakavu	Poultry (2*25000)	50000	44000	6000	NIL	_	2
6				Goat(1*50000)	50000	25000	25000	nil	1	_
7				Adukkalathottam(2*25000)	50000	42000	8000	NIL	2	_
8				Total (5 group)	150000	111000	39000	nil	3	2
9		Thripunithura Municipality,Mulanthuruthy,Udayamperoor	Vattukunnu-Karingachira	Poultry (15*25000)	375,000	330,000	45000	NIL	_	15
10				Goat (20*50000)	1,000,000	500,000	500000	nil	10	10
11				Mushroom Cultivation (9*45000)	405000	225000	180000	nil	4	5
12				Rabbit rearing (9*27500)	247500	225000	22500	nil	4	5
13				Duck rearing(1*62500)	62500	25000	37500	nil		1
14				Bee keeping (4*21000)1 Group/7colony	84000	76000	8000	nil	2	2
15				Adukkalathottam (15*25000)	375000	330000	45000	nil	10	5
16				Flori Culture(2*50000)	100000	50000	50000	nil	1	1
17				**Total (75 group)**	**2,649,000**	**1,761,000**	**888000**		**31**	**44**
18		Chottanikkara Thripunithura(23) Thiruvaniyoor	Kunnathunadu-Thalakodu	Poultry (15*25000)	375,000	330,000	45000	NIL	_	15
19				Goat (8*50000)	400,000	200,000	200000	nil	4	4
20				Mushroom Cultivation (2*45000)	90,000	50,000	40000	nil	1	1
21				Rabbit rearing (2*27500)	55,000	50,000	5000	nil	1	1
22				Bee keeping (2*21000)1 Group/7colony	42,000	38,000	40000	nil	1	1
23				Adukkalathottam (5*25000)	125,000	110,000	15000	nil	3	2
24				**Total (34 Group)**	**1,087,000**	**778,000**	**345000**		**10**	**24**

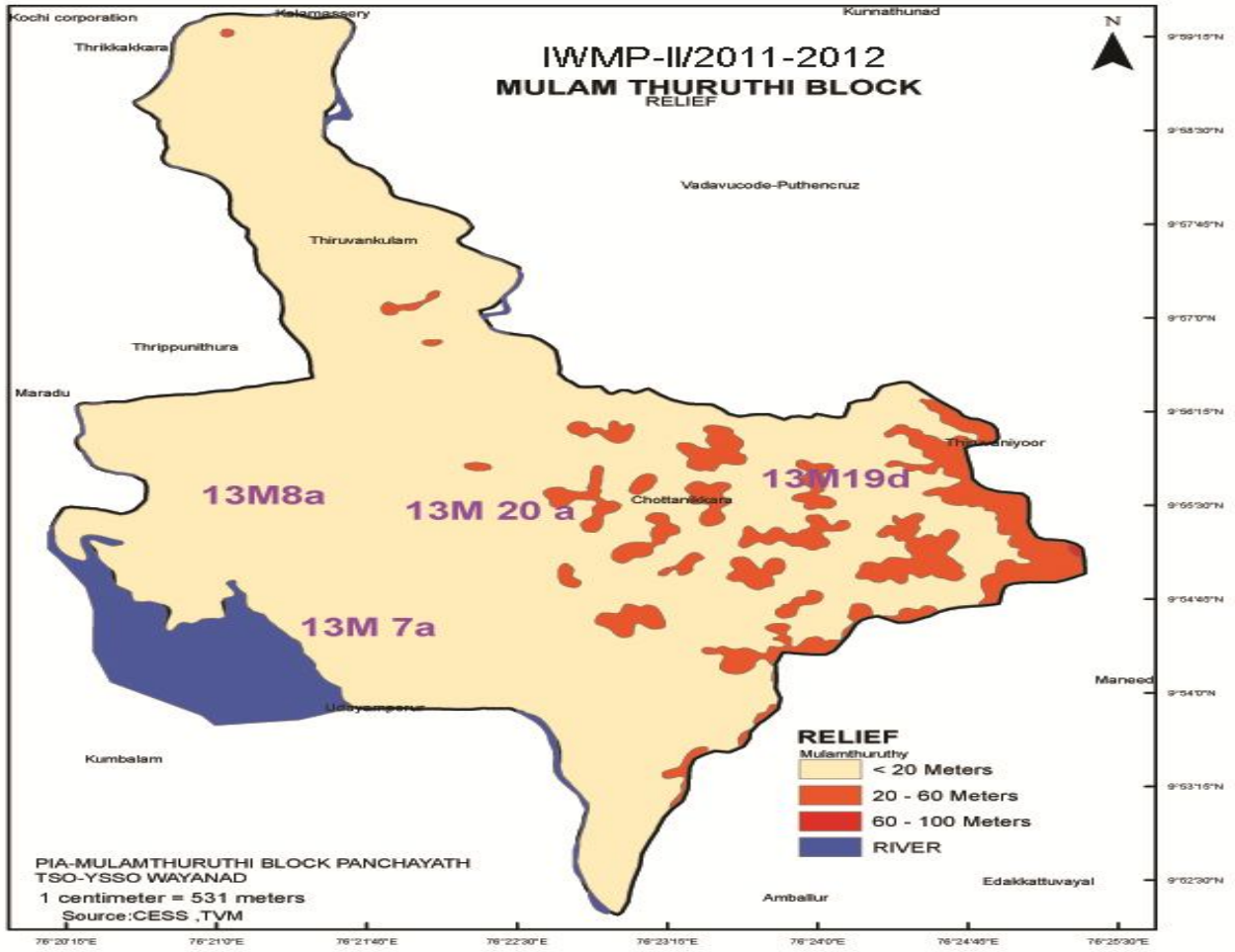
Major Activities Loan Linked Scheme (30%)--þ1201716

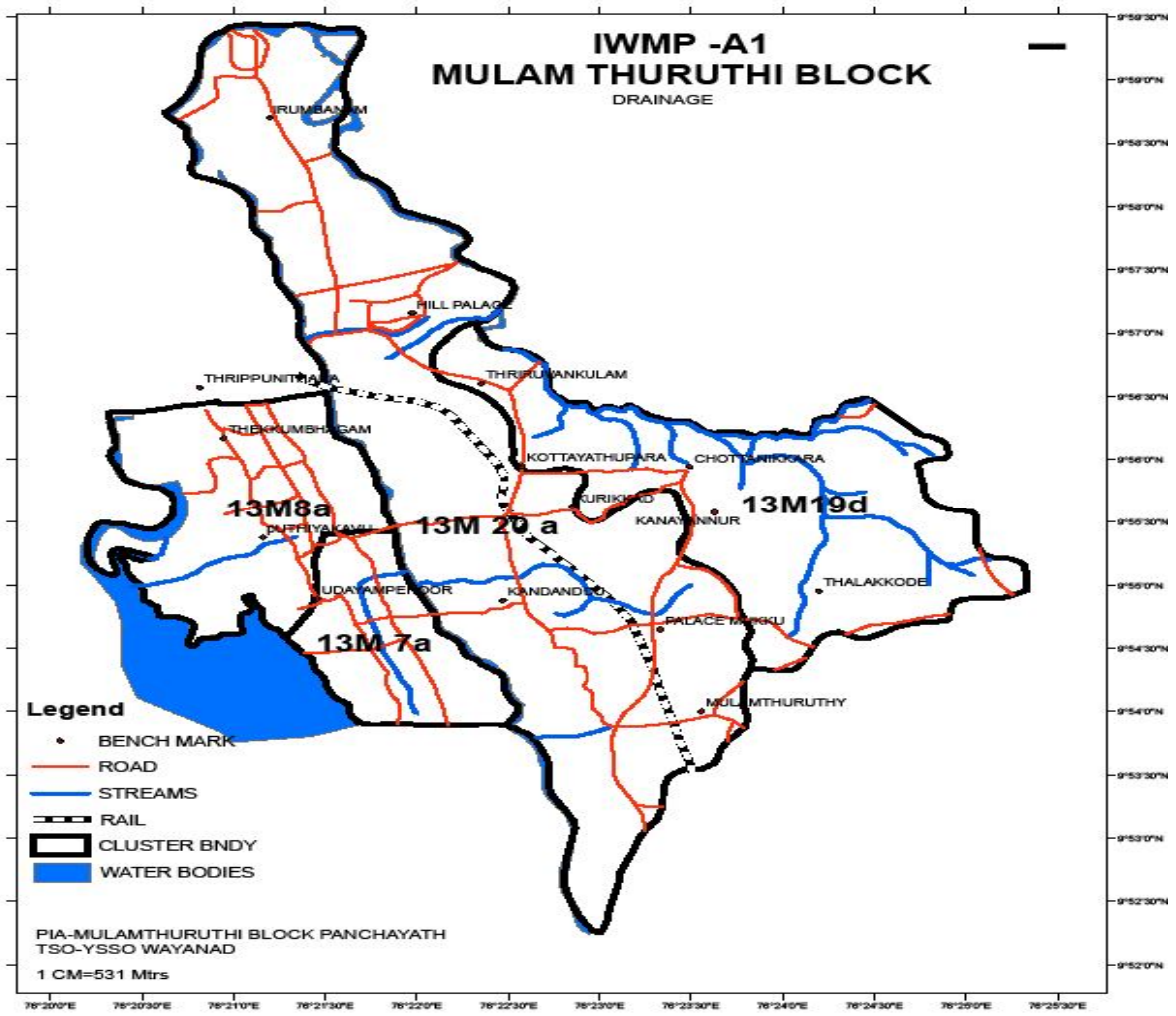
SLNO	Name of Scheme	Grama Panchayath	Total Amount	Bank Loan	IWMP Fund	Financial Assistance
1	Cage Fish Farming	Udayamperoor (Ameda Watershed)	200,000	100,000	100,000	SBT Udayamperoor
	Total		**200,000**	**100,000**	**100,000**	
2	Tailoring Unit (2)	**Thripunithura Municipality, Mulanthuruthy, Udayamperoor, (Vattakunnu-Karingachira)**	400000	200000	200000	SBT Udayamperoor, Mulanthuruthy, Thiruvankulam, Union Bank Mulanthurtuhy, Thiruvankulam, Kerala Gramin Bank Mulanthuruthy
	Chips Unit		200000	100000	100000	
	Catering Unit		200000	100000	100000	
	Diary Unit		200000	100000	100000	
	Nursery Unit (Fruit Plants)		200000	100000	100000	
	Buffalos chaffs rearing unit		200000	100000	100000	
	Total		**1400000**	**700000**	**700000**	
3	Catering Unit	Chottanikkara, Thripunithura Municipality (23)Thiruvaniyoor, (Kunnathunadu Thalakodu)	200000	100000	100000	SBT, Vijaya Bank Chottanikkara, Bank of India Thiruvaniyoor
	Diary Unit		200000	100000	100000	
	Tailoring Unit		200000	100000	100000	
	Total		**600000**	**300000**	**300000**	

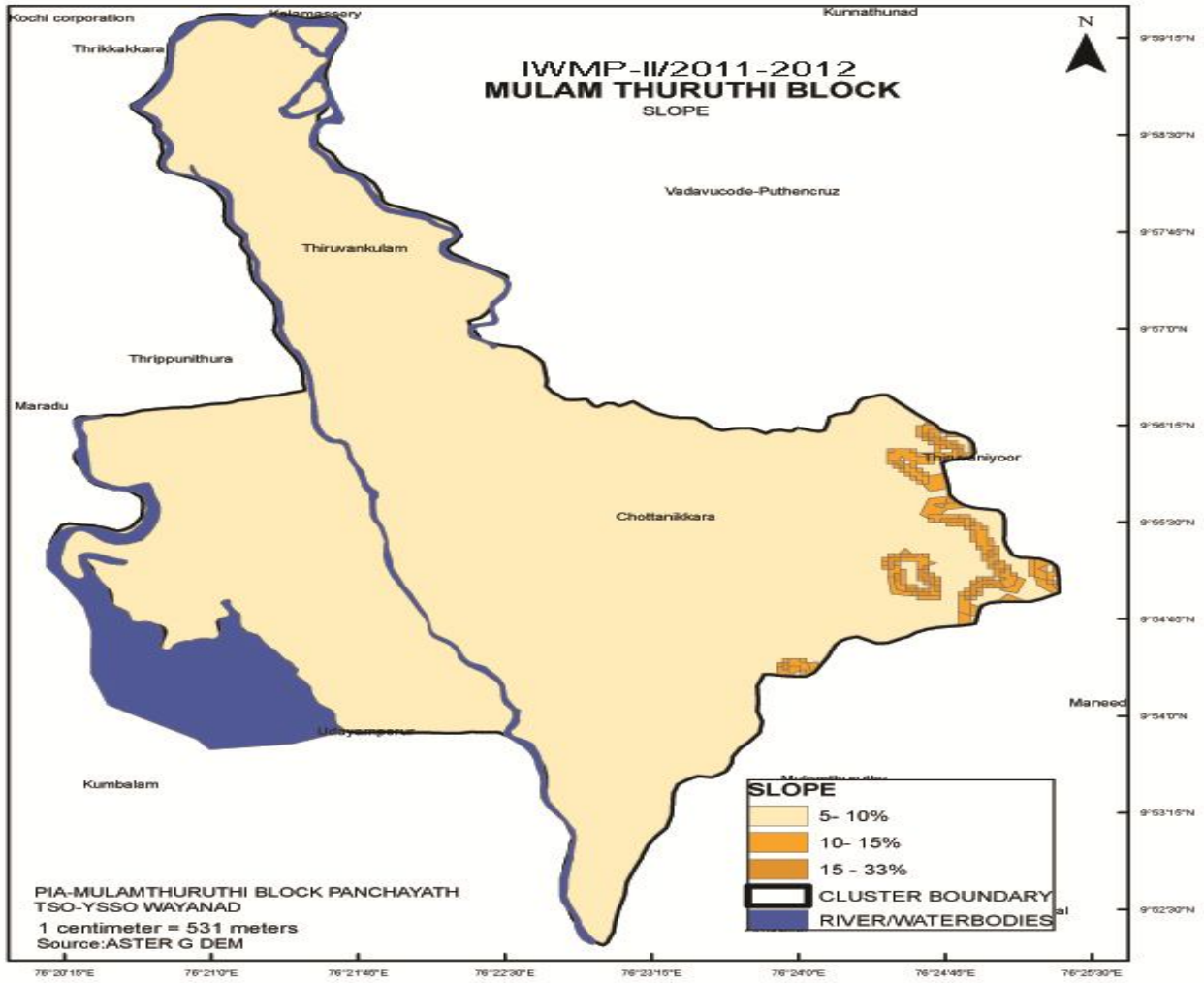
ANNEXURE

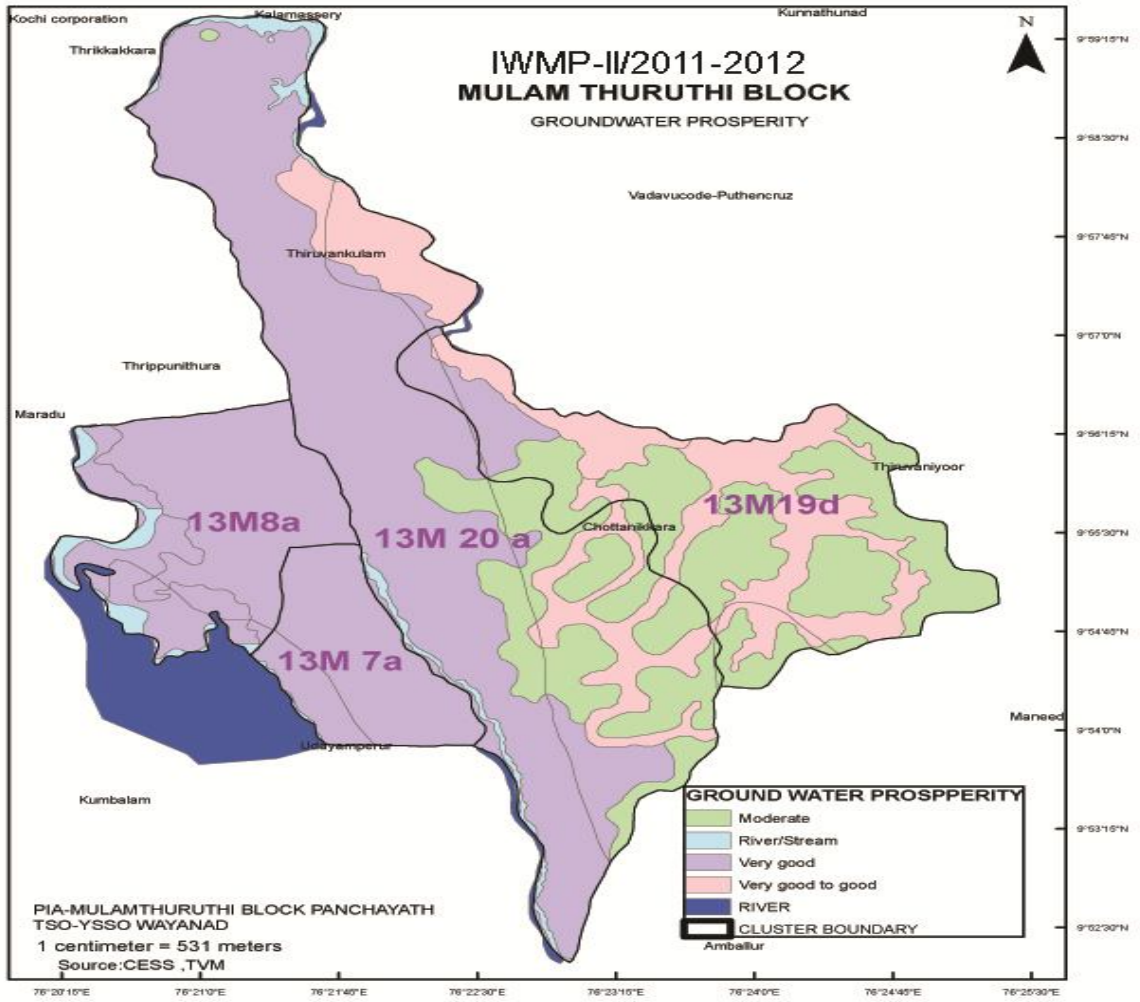
MAPS

ESTIMATES AND SKETCHES

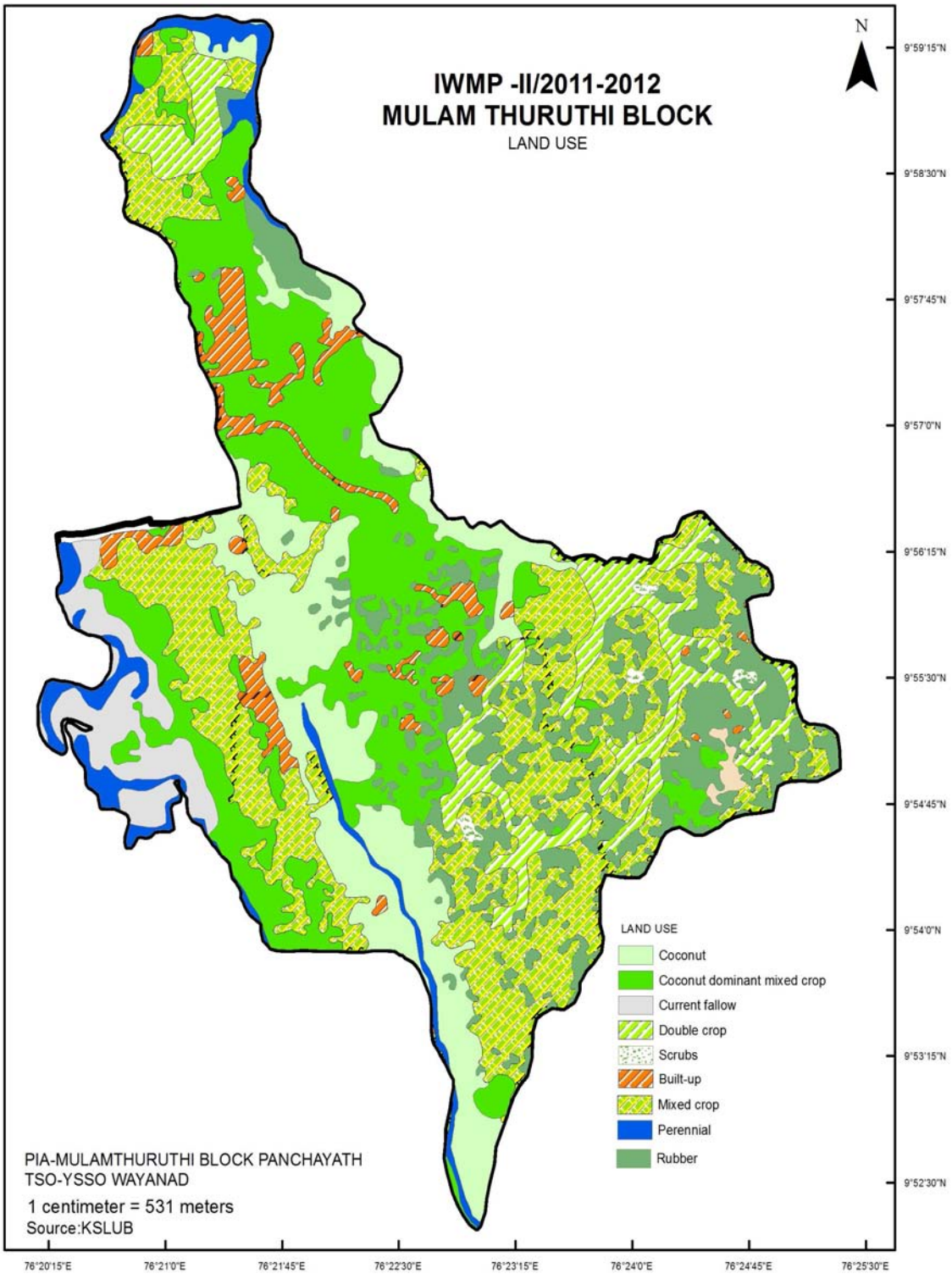

IWMP-II/2011-2012
MULAM THURUTHI BLOCK
RELIEF
Kochi corporation
Kunnathunad
Thrikkakkara
Vadavucode-Puthencruz
Thiruvankulam
Thrippunithura
Maradu
13M8a
13M 20 a
13M19d
13M 7a
Chottanikkara
Manead
Kumbalam
Amballur
Edakkattuvayal
RELIEF
Mulamthuruthy
< 20 Meters
20 - 60 Meters
60 - 100 Meters
RIVER
PIA-MULAMTHURUTHI BLOCK PANCHAYATH
TSO-YSSO WAYANAD
1 centimeter = 531 meters
Source:CESS ,TVM
N


IWMP -A1
MULAM THURUTHI BLOCK
DRAINAGE
13M8a
13M 20 a
13M19d
13M 7a
THRIPPUNITHURA
KOTTAYATHUPARA
CHOTTANIKKARA
KANAYANNUR
THALAKKODE
MULAMTHURUTHY
Legend
BENCH MARK
ROAD
STREAMS
RAIL
CLUSTER BNDY
WATER BODIES
PIA-MULAMTHURUTHI BLOCK PANCHAYATH
TSO-YSSO WAYANAD
1 CM=531 Mtrs


IWMP-II/2011-2012
MULAM THURUTHI BLOCK
SLOPE
Kochi corporation
Kalamassery
Kunnathunad
Thrikkakkara
Vadavucode-Puthencruz
Thiruvankulam
Thrippunithura
Maradu
Chottanikkara
Maneed
Kumbalam
N
SLOPE
5- 10%
10- 15%
15 - 33%
CLUSTER BOUNDARY
RIVER/WATERBODIES
PIA-MULAMTHURUTHI BLOCK PANCHAYATH
TSO-YSSO WAYANAD
1 centimeter = 531 meters
Source:ASTER G DEM


IWMP-II/2011-2012
MULAM THURUTHI BLOCK
GROUNDWATER PROSPERITY
N
Kochi corporation
Kalamassery
Kunnathunad
Thrikkakkara
Vadavucode-Puthencruz
Thiruvankulam
Thrippunithura
Maradu
Thiruvaniyoor
Chottanikkara
13M8a
13M 20 a
13M19d
13M 7a
Maneed
Kumbalam
Amballur
GROUND WATER PROSPPERITY
Moderate
River/Stream
Very good
Very good to good
RIVER
CLUSTER BOUNDARY
PIA-MULAMTHURUTHI BLOCK PANCHAYATH
TSO-YSSO WAYANAD
1 centimeter = 531 meters
Source:CESS ,TVM

Map.11: Land Use



hmb]m-[n-jTnX kwcw`w (30%) - -þ1201716

{Ia \w.	kwcw-`¯nsâ t]c	{Kma]©m-b¯	AS-¦Â XpI	_m¦ hmb]	[\ kImbw	[\-Imcy Ømt]-\-§Ä
1	IqSaX kyIrjn	DZbwt]cqÀ (BtaS \oÀ¯Sw)	200,000	100,000	100,000	Fk._n.Án DZbwt]cqÀ
	BsI		**200,000**	**100,000**	**100,000**	
2	ssSednwM bqWnÁ (2)	**Xy¸pWn¯d ap\nkn¸menän apf´pcp¯n,DZbwt]qÀ (h«¡p¶þIcn§m¨nd)**	400000	200000	200000	Fk._n.Án DZbwt]cqÀ, apf´pcp¯n, Xncphm¦pfw, bqWnb³_m¦ apf´pcp¯n Xncphm¦pfw, tIcf {Kmao¬_m¦ apf´pcp¯n
	Nn]k bqWnÁ		200000	100000	100000	
	ImÁdnwK bqWnÁ		200000	100000	100000	
	Ubdn bqWnÁ		200000	100000	100000	
	^ehr£ssX \gkdn bqWnÁ		200000	100000	100000	
	amSphfÀ¯Â bqWnÁ		200000	100000	100000	
	BsI		**1400000**	**700000**	**700000**	
3	ImÁdnwK bqWnÁ	tNmäm-\n-¡c,Xy¸p-Wn-¯d-ap\n-kn-¸m-enän (23]qÀ®ambpw) XvncphmWnbqÀ (Ip¶¯p\mSpXet¡mS)	200000	100000	100000	Fk_nän, hnPb¯_m¦ tNmäm\n¡c, _m¦ Hm^C´y Xncphmwnbqà
	Ubdn bqWnÁ		200000	100000	100000	
	ssSednwM bqWnÁ		200000	100000	100000	
	BsI		**600000**	**300000**	**300000**	

]cn-io-e\w

{Ia \w.	\oÀ¯S¯nsâ-t]c	ASn-Øm\Ah-t_m[ ]cn-io-e\w (BOT)		kwc-`-IXz]cn-io-e\w (EDP)		sshZyK[y]cn-io-e\w (Skill Development Training)		Bsl		]cn-io-e-\-¯n-\mbnsXc-s ª-Sp-ip¶ Øm]-\-§Ä
		F®w	Xpl	F®w	Xpl	F®w	Xpl	F®w	Xpl	
1	BtaS \nÀ¯Sw	2	7000	2	7000	1	6000	5	20000	Hasthkala Institute Mulanthuruthy, RCITY,ETC MANNOOTHY
2	]pXnblmhv	1	3000	1	3000	1	1500	3	7500	Hasthkala Institute Mulanthuruthy,RCITY,ETC MANNOOTHY
3	h«-ip¶v---Icn§m¨nd	10	46000	10	46000	6	50000	26	142000	Hasthkala Institute Mulanthuruthy, RCITY,ETC MANNOOTHY
4	Ip¶-¯p-\mS--v----Xe-tImSv	5	21000	5	21000	2	19000	12	61000	RCITY,ETC MANNOOTHY
	Bsl							46	230500	

{]Xo-£nX t\«w

{Ia \w.	\oÀ¯S¯nsâ-t]c	Irjntbm-Ky-am-in b A[nI `qan	A[nI [m\y/Ing§ Dem-Z\w	A[nI]¨-id Dem-Z\w	A[nI]mÂ Dem-Z\w	A[nI ap« Dem-Z\w	A[nI Cd¨n Dem-Z\w	A[nI hcp-am\w
1	BtaS \nA Sw	200 Ha	–	1200Kg/Year	5760 Liter/Year	9600 nos /Year	600 Kg/Year	434,400
2	]pXnblmhv	50 Ha	–	600Kg/Year	1800 Liter/Year	4200nos /Year	300Kg/Year	171,000
3	h«-ip¶v---Icn§m¨nd	1500 Ha	1000 Kg/Year	6000Kg/Year	216000 Liter/Year	30000 nos /Year	2400Kg/Year	94, 70000
4	Ip¶-¯p-\mS--v----Xe-tImSv	500 Ha	–	12000Kg/Year	19200 Liter/Year	28800 nos/Year	1800Kg/Year	16;32000

{]hA \ le-A

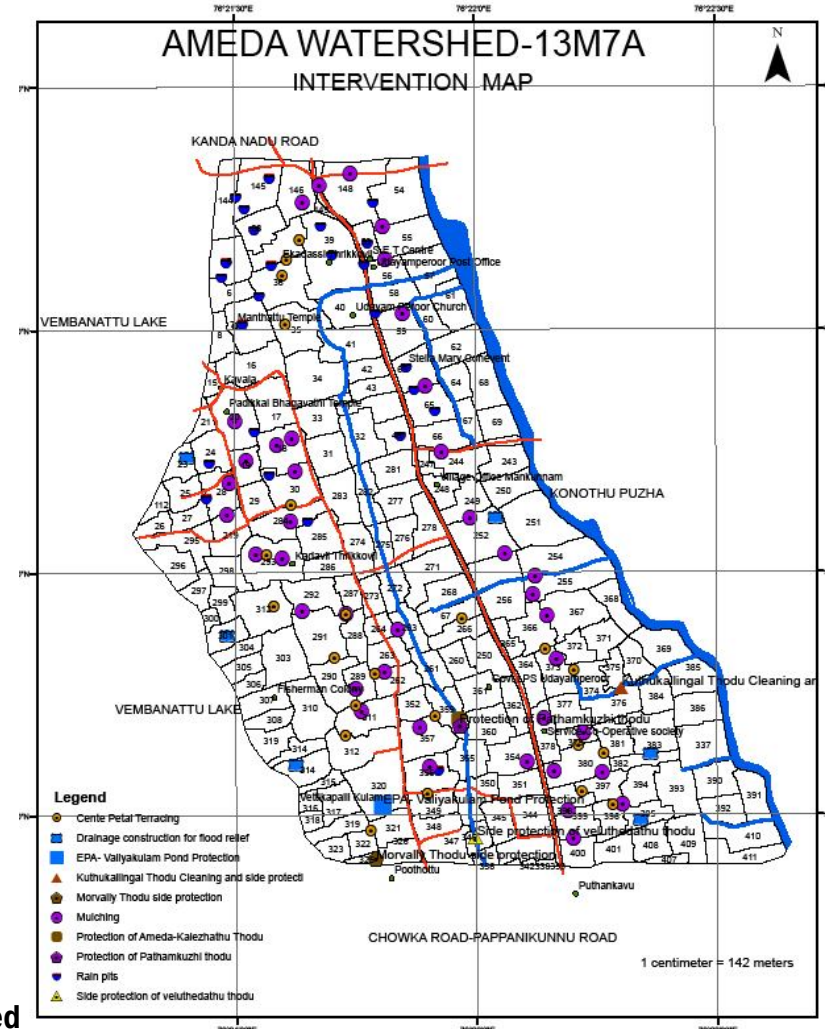
2014 - 15 þA (H¶ mw L «w)

{la \w.	July & August	September	October	November
	At]£ kzol-cn-¡Â	WDS, WC-t»m¡ sehÂ kanXn]cn-tim-[\, AwKo-lmcw	]cn-io-e\w	hnX-cWw
1	Btas\oÀ¯ Sw 6 bqWnäqlÄ¡ (BS &-aXkyw sP FAPn At]£ lA)	AwKo-lmcw t\SWw	BSqhfÀ¯Â	6 bqWnäqlÄ¡
2	]pXnblmh\oÀ¯ Sw-3-bqWnäqlÄ¡ (BS &-ASp-¡ft¯ m«w sP FÂPn At]£ lÄ)	AwKo-lmcw t\SWw	BSqhfÀ¯Â ASp-¡f t¯m«w	3 bqWnäqlÄ¡
3	h«p¡p¶þ lcn§mNnd \oÀ¯ Sw-3-1 bqWnäqlÄ¡ (BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨,]pj]Irjn sP FAPn At]£ lA)	AwKo-lmcw t\SWw	BSqhfÀ¯Â ASp-¡ft m«w lq¬,apbÂ,tX\o¨,]pj]Irjn	31 bqWnäqlÄ¡
4	lp¶ p\mSpXet¡mS \oÀ¯ Sw-10 bqWnäqlÄ¡ (BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨, sP FAPn At]£ lA)	AwKo-lmcw t\SWw	BSqhfÀ¯Â ASp-¡ft m«w lq¬,apbÂ,tX\o¨,	10 bqWnäqlÄ¡

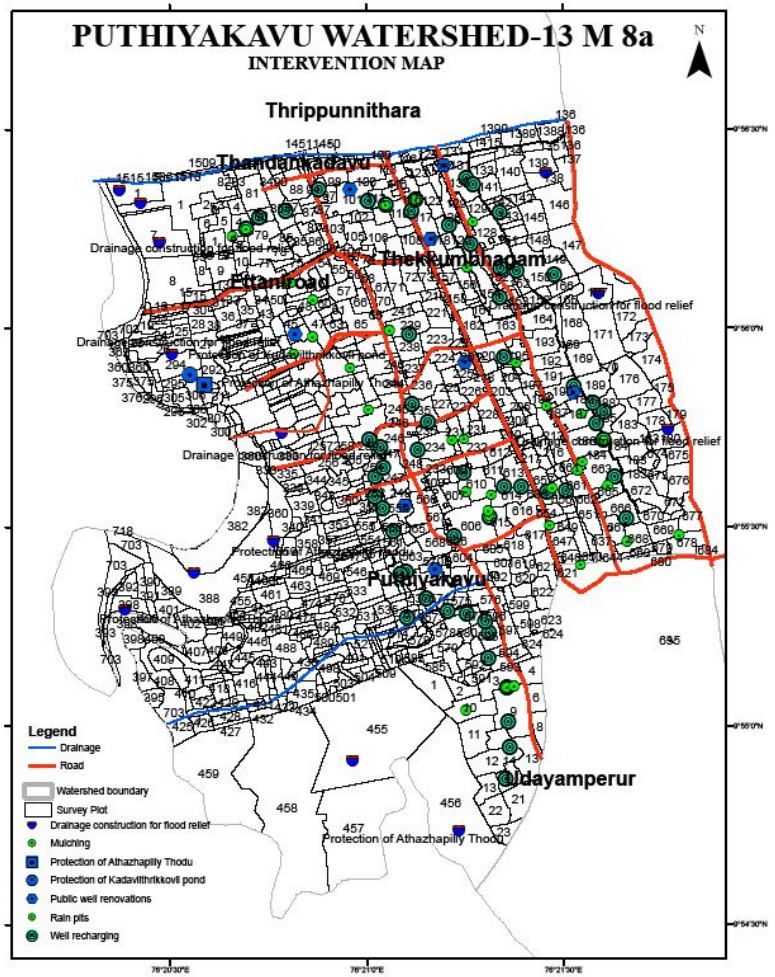
2014 - 15 þÂ (c□mw L «w)

{la \w.	December	January	February	March
	At]£ kzol-cn-¡Â	WDS, WC-t»m¡ sehÂ kanXn]cn-tim-[\, AwKo-lmcw	]cn-io-e\w	hnX-cWw
1	Btas\oÀ¯ Sw 5 bqWnäqlÄ¡ (tlmgn sP FÂPn At]£ lÄ)	AwKo-lmcw t\SWw	tlmgn hfÀ¯Â	5 bqWnäqlÄ¡
2	]pXnblmh\oÀ¯ Sw-2 bqWnäqlÄ¡ (tlmgn sP FAPn At]£ lA)	AwKo-lmcw t\SWw	tlmgn hfÀ¯Â	2 bqWnäqlÄ¡
3	h«p¡p¶þ lcn§mNnd \oÀ¯ Sw-44 bqWnäqlÄ¡ _(tlmgn BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨,]pj]Irjn sP FAPn At]£ lA)	AwKo-lmcw t\SWw	tlmgn BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨,]pj]Irjn	44 bqWnäqlÄ¡
4	lp¶ p\mSpXet¡mS \oÀ¯ Sw-11 bqWnäqlÄ¡ _(tlmgn BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨, sP FÂPn At]£ lÄ)	AwKo-lmcw t\SWw	tlmgn BS &-ASp-¡ft¯ m«w lq¬,apbÂ,tX\o¨,	11 bqWnäqlÄ¡

Map.13: Intervention Map of Ameda Watershed

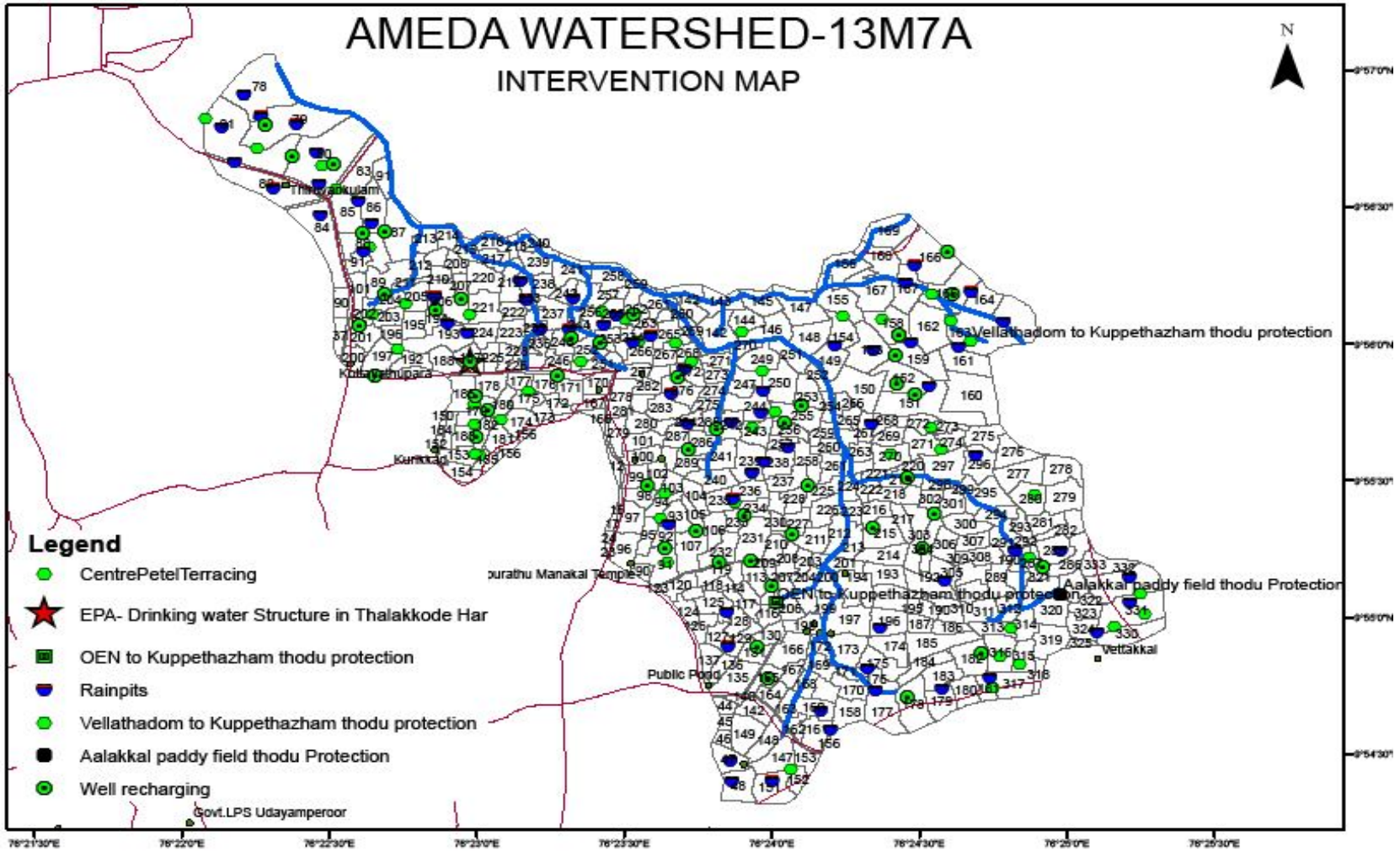


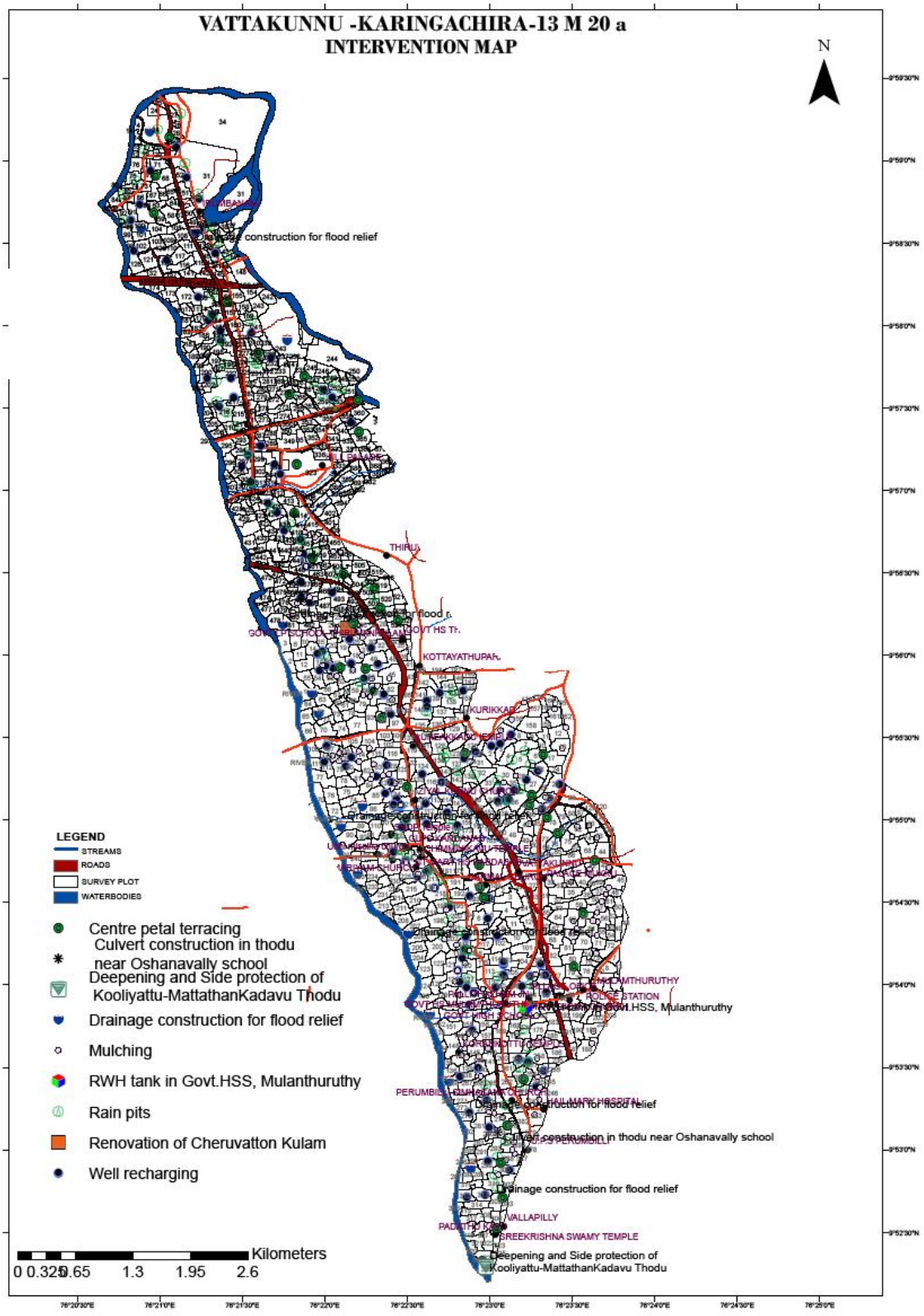
Map.14: Intervention Map of Puthiyakavu



hed

MAP .15:.INTERVENTION MAP OF KUNNATHUNADU-THALAKKODE WATERSHED




VATTAKUNNU -KARINGACHIRA-13 M 20 a
INTERVENTION MAP
N
LEGEND
STREAMS
ROADS
SURVEY PLOT
WATERBODIES
Centre petal terracing
Culvert construction in thodu near Oshanavally school
Deepening and Side protection of Kooliyattu-MattathanKadavu Thodu
Drainage construction for flood relief
Mulching
RWH tank in Govt.HSS, Mulanthuruthy
Rain pits
Renovation of Cheruvatton Kulam
Well recharging
Kilometers
0 0.325 0.65 1.3 1.95 2.6
THIRU
KOTTAYATHUPAR
KURIKKAD
POLICE STATION
PERUMBIL
VALLAPILLY
SREEKRISHNA SWAMY TEMPLE
Deepening and Side protection of Kooliyattu-MattathanKadavu Thodu