

OFFICE OF THE CHIEF ENGINEER  
LOCAL SELF GOVERNMENT DEPARTMENT  
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No. DB4/5878/2015/CE/LSGD

Dated : 26.07.2017

**Circular**

Sub:- CWRDM – WRMTP Training for the year 2017-18 Reg.

Ref:- Lr. No. 1740/CWRDM/TEED/WRMTP/17-18 dated 21.06.2017

CWRDM Kozhikkode has informed this office regarding the training programmes on various water related topics under Water Resource Management Project (WRMTP) for the year 2017-18. There is no registration fee for the above training courses and the boarding and lodging expenditure will be borne by CWRDM. The venue and date of training are mentioned in the training calendar 2017-18. Further details will be available from [www.cwrmdm.org](http://www.cwrmdm.org).

The interested officers of the department can participate in the training programme, with prior sanction from the higher officers, without affecting their office duty.

Encl : Training Calendar 2017-18



*Chief Engineer*

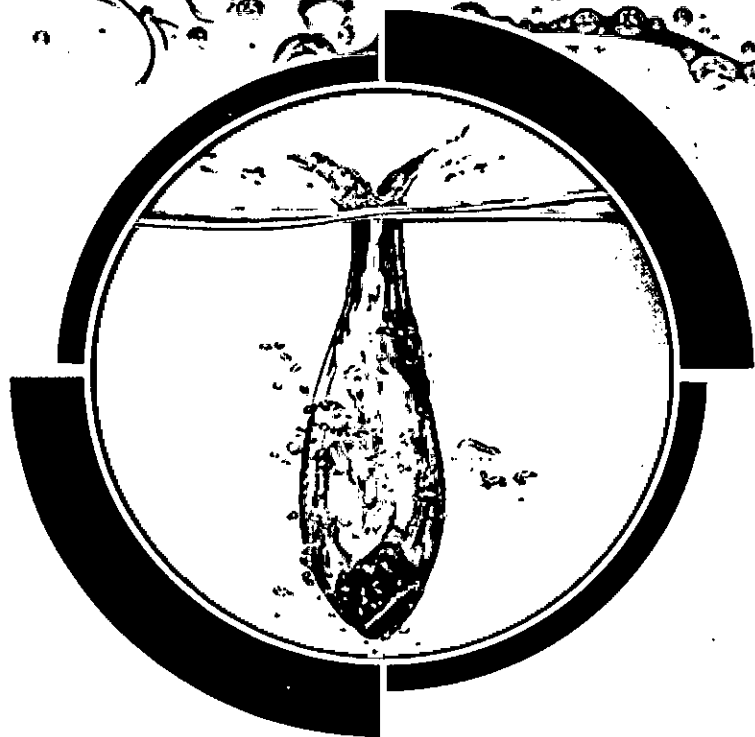
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# CWRDM TRAINING CALENDAR 2017-18

WATER RESOURCES MANAGEMENT  
AND TRAINING PROJECT (WRMTP)



**CENTRE FOR WATER RESOURCES  
DEVELOPMENT AND MANAGEMENT**  
KUNNAMANGALAM KOZHIKODE 673 571 KERALA



### **Mission**

Our mission is to enhance the quality of life by ensuring water security for all by providing necessary Research and Development inputs, with special emphasis on the humid tropics.

### **Vision**

Centre for Water Resources Development & Management shall be a Centre of Excellence catering to the R & D demands in all spheres of water management.

## About the Organization

Centre for Water Resources Development and Management is a premier Research & Development institution of Kerala State Council for Science, Technology and Environment (KSCSTE). CWRDM basically caters to the R&D needs in the fields of water and water related aspects (surface water, groundwater, water management-agriculture, water quality etc) with special reference to Humid Tropics. The Centre has about 60 scientists and technical staff specialized in different disciplines of water resources and allied subjects. The Research Council, consisting of eminent scientists, guides the research activities of the Centre. The three Sub Centres located at Manimalakunnu (Ernakulam), Kottayam and Neyyattinkara (Thiruvananthapuram) work with the major objective of solving the water related issues and problems of the respective locations.

## Water Resources Management & Training Project (WRMTP)

In 1988, CWRDM was identified as the State level organization to play the role of Water and Land Management Institute (WALMI) of Kerala to carry out water resources management training for the user departments. Accordingly, the Irrigation Management Training Project (IMTP) assisted by the USAID started functioning in the Centre for Water Resources Development and Management in May 1988. The programme has been renamed as Water Resources Management & Training Project (WRMTP) and now training is imparted in all aspects of water management. WRMTP is envisaged to bridge the gap between irrigation potential created and utilized by imparting active training to all personnel involved in irrigated agriculture and through action research programmes. In addition to the training programmes being conducted for officers and farmer leaders, CWRDM regularly takes up action research and adaptive trials on various aspects of irrigation water management in the command areas.

## **Fee structure**

The WRMTP training courses are offered free of cost to the officials of the Kerala State Departments.

## **Campus and facilities**

The main campus of CWRDM with 30 hectares of land area is located at Kottamparamba, situated about 13 km east of Calicut (Kozhikode) city. Kozhikode is well connected to the rest of the country by road, rail and air. The Centre is well equipped with all facilities for excellent conduct of training courses viz. air conditioned auditorium, class rooms, conference rooms, laboratories, computer facilities, canteen etc. Lodging facilities can be provided to the participants in the trainees hostel within CWRDM campus.

## **How to reach**

Please see the route sketch shown on the back cover of this training calendar.

## **Nominations**

Nominations with complete office and residence address with e-mail address & phone numbers of the participants may be sent to the respective Course Co-ordinators with a copy to the Head, Training Education & Extension Division, CWRDM at least a fortnight in advance. There is no formal registration/ application form for the training programmes.

**WRMTP Training Calendar 2017-18 at a glance**

Sl No	Name of the Training Course	Date	Month & Year	Venue
1	Planning of Water Supply and Sanitation Projects	11	July 2017	CWRDM, Kozhikode
2	Application of Isotope Tracer Techniques for Water Resources Development and Management	07-09	August 2017	CWRDM, Kozhikode
3	Advanced Techniques for Hydrological Investigations	08-11	August 2017	CWRDM, Kozhikode
4	Integrated Water Resources Management	22-23	August 2017	Ernakulam
5	Safe Water and Human Health	23-24	August 2017	CWRDM, Kozhikode
6	Performance Evaluation and Benchmarking of Irrigation Projects	24-26	August 2017	CWRDM SC, Neyyattinkara
7	Integrated Watershed Management - Monitoring and Evaluation	14-16	September 2017	CWRDM, Kozhikode
8	Hydrologic Modelling for Water Resources Management	18-20	September 2017	CWRDM, Kozhikode
9	Introduction to Disaster Management with Emphasis on Flood and Drought	26-28	September 2017	CWRDM, Kozhikode
10	Water Quality Monitoring Techniques	03-07	October 2017	CWRDM, Kozhikode
11	Shallow and Deep Aquifer Interaction	04-05	October 2017	CWRDM, Kozhikode
12	Strategies for Groundwater Development and Management	10-12	October 2017	CWRDM, Kozhikode
13	Reservoir Sedimentation, Computation and Control	10-13	October 2017	KERI, Peechi

14	Irrigation Water Management (Induction Course)	24-24	October – November 2017 (One month)	CWRDM, Kozhikode
15	Environmental Impact Assessment of Water Resources Projects	25-27	October 2017	CWRDM, Kozhikode
16	Application of Decision Support System in Irrigation Management	02-04	November 2017	CWRDM, Kozhikode
17	Water and Wastewater Treatment Technologies	07-09	November 2017	CWRDM, Kozhikode
18	Artificial Groundwater Recharge-Concepts, Planning and Techniques	15-17	November 2017	CWRDM, Kozhikode
19	Coastal Erosion Problems and Protection Measures in Kerala	20-23	November 2017	CWRDM, Kozhikode
20	Introduction to Advanced Mapping Techniques for Water Resources Management	28-30	November 2017	CWRDM, Kozhikode
21	Irrigation Water Management	05-08	December 2017	CWRDM, Kozhikode
22	Advanced Techniques for Hydrological Investigations	05-08	December 2017	Kottayam
23	Design of Minor Irrigation Structures	12-14	December 2017	CWRDM, Kozhikode
24	Water Sector – Climate Change, Adaptation and Mitigation	19-20	December 2017	CWRDM, Kozhikode
25	Introduction to Application of RS & GIS in Water Resources Management	03-05	January 2018	CWRDM, Kozhikode
26	Introduction to QGIS and QSWAT	09-11	January 2018	CWRDM, Kozhikode
27	Wetland Conservation and Management	10-11	January 2018	CWRDM, Kozhikode
28	Dam Safety and Emergency Response	16-18	January 2018	CWRDM, Kozhikode

## Profile of Training Courses Offered During 2017-18

### 1. Planning of Water Supply and Sanitation Projects

Duration: 1 day

Date: 11 July 2017

Venue: CWRDM, Kozhikode

#### Course Coordinators

Er P Jayakumar &amp; Er B Vivek

#### Contents

Water supply and sanitation scenario of our country; aspects to be considered in planning of water supply schemes; implementation of projects-important factors; importance of sanitation; appropriate technologies for waste disposal; sustainable management of water supply and sanitation projects.

#### Expected Deliverables

To introduce the basic aspects involved in planning and implementation of water supply & sanitation projects.

#### Target Participants

Presidents, BDO's and Councillors of Panchayaths/Blocks/Corporations.

### 2. Application of Isotope Tracer Techniques for Water Resources Development and Management

Duration: 3 days

Date: 07-09 August 2017

Venue: CWRDM, Kozhikode

#### Course Coordinators

Dr C Ünnikrishnan Warriar &amp; Dr TR Resmi

#### Contents

Lectures and discussion on topics like basic concepts of isotopes; stable and radioactive isotopes and their application in hydrological studies; seepage estimation in dams and canals; inter-connection between water bodies; groundwater occurrence and recharge mechanism; rain water characterization; pollutant source discrimination; estimation of rate and pattern of sedimentation in lakes and reservoirs etc.; instrumentation and analytical techniques related to the topics.

#### Expected Deliverables

Create awareness among the participants and familiarize them with the emerging field of isotope hydrology and its applications. Providing an insight into the basic concepts and analytical methods



for the use of isotope based techniques in hydrological and hydrogeological investigations. Apprising the participants on the status of isotope hydrology in the country and their immense potential to address water resources problems. Enabling the practicing Engineers and Hydrologists to identify possible field and laboratory applications of isotope techniques in their respective areas of activity.

### **Target Participants**

Officers working in Departments of Irrigation, Agri., GW, Forest, LSG, KSEB and KWA. Technical personnel in other quasi-government departments.

### **3. Advanced Techniques for Hydrological Investigations**

Duration: 4 days

Date: 08-11 August 2017

Venue: CWRDM, Kozhikode

### **Course Coordinators:**

Er TK Drissia & Dr AB Anitha

### **Contents**

Need for hydrological investigations; conventional techniques and methods for hydrological investigations; application of Remote Sensing and GIS; application of isotopic techniques in surface water and groundwater investigations; advanced techniques for measurement of soil erosion and reservoir sedimentation; advanced instrumentation for hydrological investigations; advanced computing techniques for hydrological and meteorological data analysis.

### **Expected Deliverables**

An exposure to conventional and modern techniques for hydrological investigations for surface water and groundwater estimation which will facilitate the trainees to efficiently carry out the hydrological analysis and decision making process.

### **Target Participants**

Engineers and Officers working in Departments of Irrigation, GW, LSG, KSEB and KWA.

### **4. Integrated Water Resources Management**

Duration: 2 days

Date: 22-23 August 2017

Venue: Ernakulam

### **Course Coordinators**

Er Babu Mathew & Dr George Abe

## Contents

IWRM as a management concept; why IWRM- key issues in watershed development & management; principles of IWRM; the process of IWRM implementation; policy and legal framework; case studies and problem solving strategies.

### Expected Deliverables

Main principles of IWRM, benefit of IWRM, identification of the main challenges in implementing IWRM.

### Target Participants

Officers from Irrigation Dept., Agri. Dept., GWD, LSGD, KWA, Land Use Dept. and Revenue.

## 5. Safe Water and Human Health

Duration: 2 days    Date: 23-24 August 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er B Vivek & Er P Jayakumar

### Contents

Challenges to clean water accessibility; importance of safe water in healthy living; waterborne and water related diseases and their preventive measures.

### Expected Deliverables

To create awareness on the importance of safe water for healthy living and impart knowledge on route of transmission of waterborne diseases - and strategies to be adopted to safeguard the quality of water.

### Target Participants

BDOs, Health Inspectors and VEOs of Panchayats / Blocks / Corporations.

## 6. Performance Evaluation and Benchmarking of Irrigation Projects

Duration: 3 days    Date: 24-26 August 2017    Venue: CWRDM SC, Neyyattinkara

### Course Coordinator

Er G K Ambili

## Contents

Overview of benchmarking; stages in benchmarking process; system performance indicators; application of RS and GIS in benchmarking; socio economic aspects of irrigation projects; water auditing; case study on benchmarking.

### Expected Deliverables

Capacity building on the need for benchmarking, the concept behind it, how it can be implemented, constraints in implementation and the outputs derived from the implementation of the process.

### Target Participants

Officers from Irrigation Dept., Agri. Dept. and KWA.

## 7. Integrated Watershed Management - Monitoring and Evaluation

Duration: 3 days    Date: 14-16 September 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er Babu Mathew & Er C M Sushanth

### Contents

Concept of watershed and its importance as a planning unit; different aspects of watershed development and management; community participation in watershed management programmes; formulating an integrated watershed development plan for a typical watershed in Kerala; integration of watershed development and management programmes; hydrologic, agronomic, social and economic indicators for evaluation of watershed development projects.

### Expected Deliverables

Understanding the various aspects of integrated watershed management including monitoring and evaluation.

### Target Participants

Junior and middle level officers from Irrigation Dept., Agri. Dept., LSGD, GWD, RDD and SS & SCD.

## 8. Hydrologic Modelling for Water Resources Management

Duration: 3 days    Date: 18-20 September 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er G K Ambili & Dr Celine George

## Contents

IWRM as a management concept; why IWRM- key issues in watershed development & management; principles of IWRM; the process of IWRM implementation; policy and legal framework; case studies and problem solving strategies.

### Expected Deliverables

Main principles of IWRM, benefit of IWRM, identification of the main challenges in implementing IWRM.

### Target Participants

Officers from Irrigation Dept., Agri. Dept., GWD, LSGD, KWA, Land Use Dept. and Revenue.

## 5. Safe Water and Human Health

Duration: 2 days    Date: 23-24 August 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er B Vivek & Er P Jayakumar

### Contents

Challenges to clean water accessibility; importance of safe water in healthy living; waterborne and water related diseases and their preventive measures.

### Expected Deliverables

To create awareness on the importance of safe water for healthy living and impart knowledge on route of transmission of waterborne diseases - and strategies to be adopted to safeguard the quality of water.

### Target Participants

BDOs, Health Inspectors and VEOs of Panchayats / Blocks / Corporations.

## 6. Performance Evaluation and Benchmarking of Irrigation Projects

Duration: 3 days    Date: 24-26 August 2017    Venue: CWRDM SC, Neyyattinkara

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## Contents

Overview of benchmarking; stages in benchmarking process; system performance indicators; application of RS and GIS in benchmarking; socio economic aspects of irrigation projects; water auditing; case study on benchmarking.

### Expected Deliverables

Capacity building on the need for benchmarking, the concept behind it, how it can be implemented, constraints in implementation and the outputs derived from the implementation of the process.

### Target Participants

Officers from Irrigation Dept., Agri. Dept. and KWA.

## 7. Integrated Watershed Management - Monitoring and Evaluation

Duration: 3 days    Date: 14-16 September 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er Babu Mathew & Er C M Sushanth

### Contents

Concept of watershed and its importance as a planning unit; different aspects of watershed development and management; community participation in watershed management programmes; formulating an integrated watershed development plan for a typical watershed in Kerala; integration of watershed development and management programmes; hydrologic, agronomic, social and economic indicators for evaluation of watershed development projects.

### Expected Deliverables

Understanding the various aspects of integrated watershed management including monitoring and evaluation.

### Target Participants

Junior and middle level officers from Irrigation Dept., Agri. Dept., LSGD, GWD, RDD and SS & SCD.

## 8. Hydrologic Modelling for Water Resources Management

Duration: 3 days    Date: 18-20 September 2017    Venue: CWRDM, Kozhikode

### Course Coordinators

Er G K Ambili & Dr Celine George

## Contents

Introduction to hydrologic modelling; components of hydrologic modelling; model calibration and validation; hands-on exercises on selected models.

### Expected Deliverables

Understanding on the components of hydrologic models, use of models for solving practical problems.

### Target Participants

Officers from Irrigation Dept., Agri. Dept., and KWA.

## 9. Introduction to Disaster Management with Emphasis on Flood and Drought

Duration : 3 days      Date: 26-28 September 2017      Venue: CWRDM, Kozhikode

### Course Coordinators

Er P J Jainet, Er T K Drissia & Dr A B Anitha

### Contents

Need for disaster management studies (flood and drought); conventional techniques; flood frequency; coastal flooding; modern techniques in drought/water scarcity and flood risk assessment; importance and preparation; Emergency Evacuation Plan; landslides and landslips; drought mitigation measures; an introduction to software MIKE 11.

### Expected Deliverables

To give an introduction to the advancement in the technology that has been used in studies related to disaster management. This will help the junior and middle level Engineers in Water Resources and other user Departments to understand the new technologies in the field of water resources and hydrology.

### Target Participants

Junior and middle level Engineers from Irrigation Dept., KSEB, Agri. Dept. and LSGD.

## 10. Water Quality Monitoring Techniques

Duration : 5 days      Date: 03-07 October 2017      Venue: CWRDM, Kozhikode

### Course Coordinators

Dr P S Harikumar & Dr K Madhavan

## Contents

Sample collection and preservation techniques; Physicochemical and microbiological characteristics of water; water quality standards for drinking, irrigation and industrial sectors ; sanitation related water quality issues; laboratory methods for water quality analysis / monitoring; methods / action to improve water quality; application of remote sensing and GIS in water quality monitoring; conventional and modern techniques in water treatment; health, hygiene and water quality.

### Expected Deliverables

This course will help the participant to understand various methods of water quality assessment; water quality parameters and its significance; water quality standards and regulations; modern methods of water quality testing; application of GIS and remote sensing in water quality monitoring; water purification methods, hygiene, health and water quality etc.; the training provides hands-on training on field and laboratory practicals on water sampling and analysis.

### Target Participants

Officers from KWA, GWD, SS & SCD, Irrigation Dept., Pollution Control Board and Jananidhi.

## 11. Shallow and Deep Aquifer Interaction

Duration: 2 days

Date: 04-05 October 2017

Venue: CWRDM, Kozhikode

### Course Coordinators

Er E Abdul Hameed, Dr C P Priju & Dr P R Arun

### Contents

Hydrogeological set up of Kerala ; type of aquifers, aquifer properties and parameters; well hydraulics; aquifer performance tests; flow through leaky aquifers; determination of interaction of aquifers using tracers ; well losses, well efficiency; multiple well systems.

### Expected Deliverables

The knowledge on the interaction between shallow and deeper aquifers, especially in the context of Kerala's complex hydrogeological setup, for precision analysis of groundwater resources.

**Target Participants**

Engineers, Hydrogeologists of GWD, Irrigation Dept., LSGD and KWA.

**12. Strategies for Groundwater Development and Management**

Duration: 3 days

Date: 10-12 October 2017

Venue: CWRDM, Kozhikode

**Course Coordinators**

Dr P R Arun, Dr C P Priju & Er C M Sushanth

**Contents**

Hydrology and groundwater scenario with special reference to Kerala; methods for groundwater targeting; groundwater resources estimation; groundwater conservation strategies; application of Remote Sensing and GIS; groundwater modelling; isotope technologies for groundwater studies.

**Expected Deliverables**

To introduce the techniques, practices and concerns involved in planning and implementation of groundwater development and management.

**Target Participants**

Officers from Irrigation Dept., LSGD, GWD, KRWSA, Agri. Dept., KWA, SS & SCD and RDD.

**13. Reservoir Sedimentation. Computation and Control**

Duration: 4 days

Date: 10-13 October 2017

Venue: KERI, Peechi

**Course Coordinators**

Dr A B Anitha, Er P J Jainet & Er P K Abdulla

**Contents**

Conventional methods for estimation of reservoir sedimentation; familiarization of modern instruments - GPS, Echo Sounder Integrated Bathymetric System and Sub Bottom Profiler ; reservoir survey using the modern instruments; familiarization of software for plotting; control measures for reducing the sediments; hands-on training of the instruments and software.

**Expected Deliverables**

To provide a better understanding in quantification of sediment yield of reservoirs using conventional and modern techniques using



Integrated Bathymetric system and Sub Bottom Profiler (of KERI) and Echo Sounder. An exposure to reservoir sedimentation survey using modern techniques which will facilitate the trainees to efficiently carry out the sedimentation survey and decision making process.

### **Target Participants**

Junior and middle level Engineers from Irrigation Dept. and KSEB.

## **14. Irrigation Water Management (Induction Course)**

Duration: 1 Month Date: 24 October- 24 November 2017 Venue: CWRDM, Kozhikode

### **Course Coordinators**

Er Babu Mathew, Er C M Sushanth & Er G K Ambili

### **Contents**

Water resources/ irrigation scenario of Kerala; investigation of irrigation system as per CWC guidelines; watershed delineation and mapping for irrigation project planning; hydrological investigations for irrigation project planning; estimation of crop water demand; technical, agronomic, economic and social feasibility of irrigation projects; PRA techniques for project planning and evaluation; geo-technical investigations for project design; Environmental Impact Assessment of irrigation projects; activities of Irrigation Department; departmental procedures and quality control; irrigation scheduling for crops- theory and tutorials; design of irrigation systems-basic fundamental aspects; quality aspects of irrigation water and visit to water quality lab; climate change impact on water resources; design of canal networks; drainage design; design of lift irrigation; design of VCB and weir; irrigation system operation; design of hydraulic structures; IWRM and water governance; water use efficiency; coastal processes and protection measures; catchment area treatment techniques; dam safety instrumentation - principles and practices; hydrological information systems; soft skills for professional excellence; interpersonal relationships and communication skills; effective presentation; time management; leadership skills and public speaking; water related laws; introduction to RS and GIS and their applications in water resources management with practicals; isotope techniques in water resources management; inter basin water transfer; water footprint; impact of climate change on water resources; field visit to major irrigation projects / organizations /

farmers fields; project data collection and preparation of project report.

### **Expected Deliverables**

An exposure and basic understanding of the different aspects of irrigation water management, which will facilitate the trainees to efficiently carry out the activities in the State Irrigation Department.

### **Target Participants**

Newly inducted Assistant Engineers in the State Irrigation Department.

## **15. Environmental Impact Assessment of Water Resources Projects**

Duration: 3 days      Date: 25-27 October 2017      Venue: CWRDM, Kozhikode

### **Course Coordinators**

Er P Jayakumar, Er B Vivek & Er C Dinil Sony

### **Contents**

Aims, objectives and principles of EIA; EIA process and methods; environmental acts and legislations; case studies.

### **Expected Deliverables**

To introduce the basic principles of EIA and procedures for carrying out EIA and getting environmental clearance for water related projects.

### **Target Participants**

Professionals involved in planning, development and implementation of projects from the Departments of Irrigation, Harbour Engineering, KSEB, Agri., GW and Pollution Control Board etc.

## **16. Application of Decision Support System in Irrigation Management**

Duration: 3 days      Date: 02-04 November 2017      Venue: CWRDM, Kozhikode

### **Course Coordinators**

Dr U Surendran, Dr K Madhavachandran & Dr VP Dinesan

### **Contents**

Overview, new concepts and rationale; application of geospatial tools (GIS, RS and GPS) and DSS in irrigated agriculture; crop water

requirement and its estimation using different methods - (theory and practical); DSS for irrigation scheduling- principles, layout and planning of irrigation scheduling; irrigation water supply based on volumetric measurement; water use efficiency of irrigation projects; real time soil moisture assessment through sensors- theory and practical; precision farming irrigation management: design and maintenance (sprinkler, drip); automation of pressurized irrigation systems with fertigation; crop growth simulation models - cropping systems models -intensification and diversification using inclusive market oriented development; agricultural productivity, land and soil characterization using agro ecological potential - concept of yield gaps.

### **Expected Deliverables**

This course will help the participants for using the DSSs in irrigated agriculture for planning, monitoring and evaluation activities. For instance, calculation of evapotranspiration (ET), soil moisture based irrigation schedules, soil and crop need based nutrient application through models for better efficiency. On the whole, the participants will gain the know-how about the DSS and how these it can be effectively used for improving the crop productivity and profitability. Besides, this course also provides hands-on training on using DSS in irrigated agriculture.

### **Target Participants**

Officers from Agri. Dept, Irrigation Dept., SS & SCD, Commodity Boards and ICAR Institutes within Kerala.

## **17. Water and Wastewater Treatment Technologies**

Duration: 3 days Date: 07-09 November 2017 Venue: CWRDM, Kozhikode

### **Course Coordinators**

Er B Vivek, Er P Jayakumar & Er C Dinil Sony

### **Contents**

Planning of water supply schemes; collection, transportation and distribution of water; water treatment techniques; sanitation measures; wastewater treatment technologies.

### **Expected Deliverables**

To introduce the technical aspects and recent developments in the field of water supply and sanitation to the officers involved in

planning and implementation of water supply and sanitation projects.

### **Target Participants**

Officers of LSGD, KWA, Jalanidhi, Municipalities / Corporations and Pollution Control Board.

## **18. Artificial Groundwater Recharge - Concepts, Planning and Techniques**

Duration: 3 Days Date: 15-17 November 2017 Venue: CWRDM, Kozhikode

### **Course Coordinators**

Dr C P Priju, Dr P R Arun, Er E Abdul Hameed & Er C M Sushanth

### **Contents**

Groundwater resources scenario of Kerala; introduction to artificial groundwater recharge - concept and need for recharge; principles of artificial recharge, advantages of recharge; planning of artificial recharge schemes; application of remote sensing, geophysics, isotope techniques and GIS in groundwater recharge studies; artificial recharge techniques and designs- direct, indirect and combination methods; soil and water conservation techniques; rooftop rainwater harvesting - concept, components and feasibility; water quality issues and health problems; impact assessment of recharge structures; economic evaluation of recharge schemes; operation and maintenance of recharge structures.

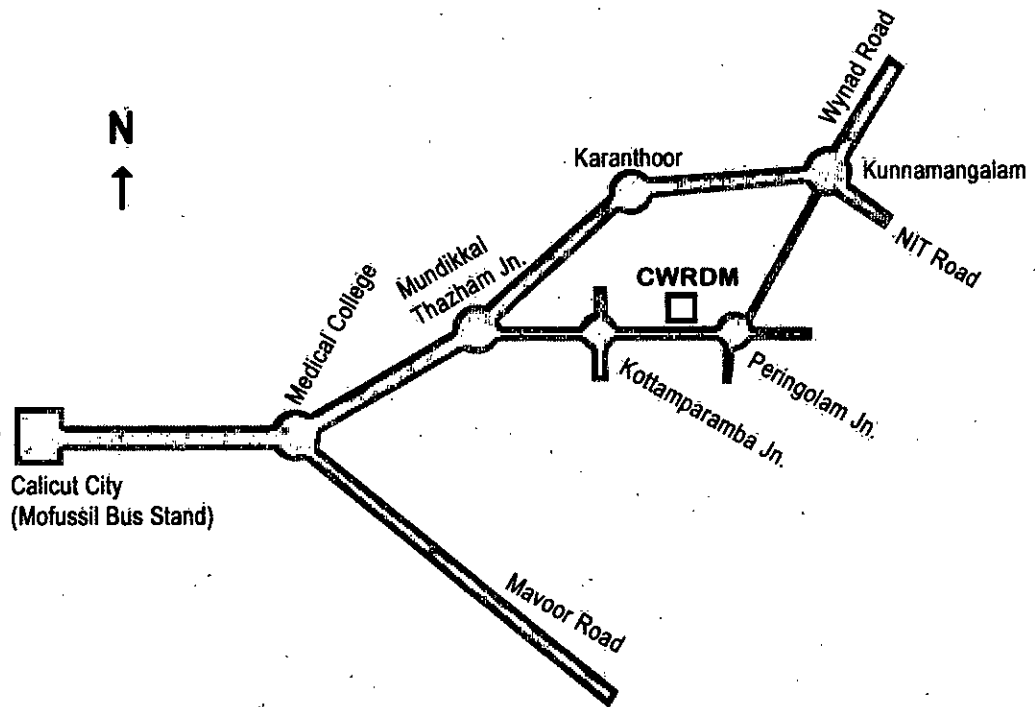
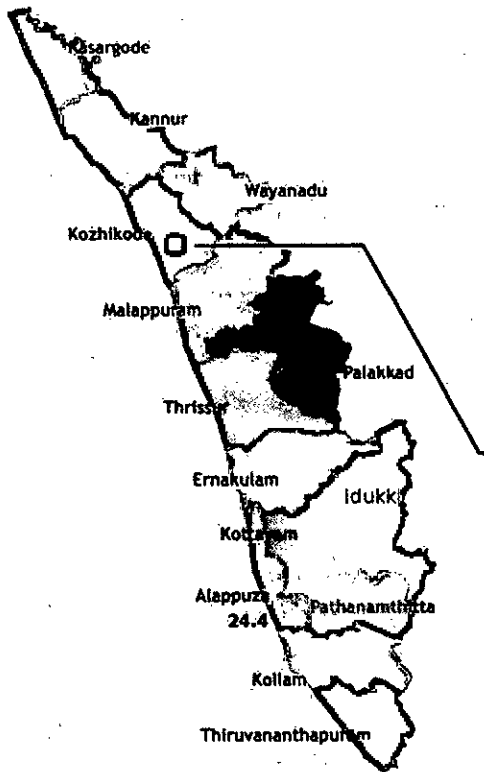
### **Expected Deliverables**

Government authorities, communities and water supply agencies are seeking ways to augment natural water sources, as climate change and development pressures increase the demand on these finite supplies. This course aims to provide the participants knowledge on different methods of groundwater conservation like artificial aquifer recharge and rainwater harvesting. The training will help the water managers to promote the need for augmentation and protection of depleting groundwater resources.

### **Target Participants**

Engineers / Hydrogeologists / Geologists / Water Managers of GWD, Irrigation Dept., KWA, Agri. Dept., LSGD, KRWSA, Mining & Geology Dept. and SS & SCD.

17	Er. Jayakumar P	Sr. Principal Scientist & Head, Environmental Studies Division	0495 2351881	jp@cwrdrn.org
18	Dr. Madhavan K	Scientist, Water Quality Division	0495 2351872	km@cwrdrn.org
19	Dr. Madhavachandran K	Sr. Principal Scientist, Water Management (Agri) Division	0495 2351847	mck@cwrdrn.org
20	Dr. Priju C P	Scientist, Ground Water Division	0495 2351858	priju@cwrdrn.org
21	Dr Resmi T R	Scientist, Isotope Hydrology Division	0495 2351865	rtr@cwrdrn.org
22	Er. Sushanth C M	Sr. Principal Scientist & Head, Ground Water Division	0495 2351854	scm@cwrdrn.org
23	Dr. Surendran U	Scientist, Water Management (Agri) Division	0495 2351852	suren@cwrdrn.org
24	Dr. Unnikrishnan Warriar C	Principal Scientist & Head, Isotope Hydrology Division	0495 2351861	warriar@cwrdrn.org
25	Er. Vivek B	Scientist B, Environmental Studies Division	0495 2351884	vivek@cwrdrn.org



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**ROUTE SKETCH OF CWRDM**

**2017****APRIL**

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**MAY**

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**AUGUST**

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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

**OCTOBER**

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

**NOVEMBER**

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

**DECEMBER**

S	M	T	W	T	F	S
31						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

**2018****JANUARY**

M	T	W	T	F	S
	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					

**FEBRUARY**

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

**MARCH**

S	M	T	W	T	F	S
						1 2 3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



For more information Contact  
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