AVAILR RESOURCES DEVELOPMENT AND MANAGEMENT

An Institution of the Kerala State Council for Science, Technology and Farman and Co

## No.1740/TEED/WRMTP/2016-17

Date: 07-06-2016

Yours faithfully,

From

The Head fraining Education and Extension Division

to The Director CPCRI Kudhu (po) Kasargod Sir,

The training calendar of the Water Resources Management and Training Project (WRMTP) for the year 2016-17 is enclosed. Kindly bring it to the notice of the officers of your department and encourage them to attend the relevant programmes. There is no registration fee for these courses. You are requested to visit our website also (www.cwrdm.org).

Looking forward to your kind cooperation and thanking you,

Head TEED Webnie HDPBaPHT Produ Encl: CWRDM Training Calendar for the year 2016-17 Nodal officer, HRD 57827, 2351803 Website www.scwirdint.org

DE PIN - 873 571 KERALA(IND(A)

# TRAINING CALENDAR 2016-17

WATER RESOURCES MANAGEMENT AND TRAINING PROJECT (WRMTP)



CENTRE FOR WATER RESOURCES DEVELOPMENT AND MANAGEMENT

RUNNAMANGALAM KOZHIKODE 673 571 KERALA



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

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.

#### 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, CWRDM regularly takes up action research and adaptive trials on various aspects of irrigation water management in the command areas.

#### Training Celenitar 2016-17

#### 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 facility can be provided to the participants in the trainees hostel within CWRDM campus.

#### How to reach

Please see the route sketch shown on the inner 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, atleast a fortnight in advance. There is no formal registration/ application form for the training programmes. Water Resources Management and Training Project (WRMTP)

#### Imming Calendar 2016-17

## WRMTP Training Calendar 2016-17 at a glance

SI No	Name of the Training Course	Date	Month & Year	Venue
1	Planning of Water Supply and Sanitation Projects	12	July 2016	Kozhikode
2	Introduction to Coastal Erosion Problems and Protection Measures in Kerala	18-21	July 2016	Kozhikode
3	Environmental Impact Assessment Process	26-27	July 2016	Kozhikode
4	Solid Waste Management to Control Water Pollution	10	August 2016	Kozhikode
5	Workshop on 'Integrated Water Resources Management'	19-20	August 2016	Kottayam
6	Application of Decision Support System in Irrigation Management	25-27	August 2016	Kozhikode
7	Benchmarking of Irrigation Projects	29-31	August 2016	Neyyattin- kara
8	Application of Isotope Tracer Techniques for Water Resources Development and Management	29 -31	August 2016	Kozhikode
9	Advanced Techniques for Hydrological Investigations	27-30	September 2016	Kozhikode
10	Hydrologic Modelling for Water Resources Management	05-07	October 2016	Neyyattin- kara
11	Strategies for Groundwater Development and Management	18-20	October 2016	Kozhikode

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Management

12	Irrigation Water Management(Induction Course)	17-17	October- November 2016	Kozhikode
13	Interaction between Shallow and Deep Aquifers	26-27	October 2016	Kozhikode
14	Introduction to Flood Management	02-04	November 2016	Kozhikode
15	Safe Water and Human Health	08-09	November 2016	Kozhikode
16	Artificial Groundwater Recharge-Concepts, Planning and Techniques	16-18	November 2016	Kozhikode
17	Advanced Techniques for Hydrological Investigations	22-25	November 2016	Koothattuku- lam/ Ernakulam
18	Water Quality Monitoring Techniques	22-26	November 2016	Kozhikode
19	Integrated Watershed Management - Monitoring and Evaluation	06- 08	December 2016	Kozhikode
20	Irrigation Water Management	07-09	December 2016	Kozhikode
21	Water Supply and Sanitation	14-16	December 2016	Kozhikode
22	Introduction to Advanced Mapping Techniques for Water Resources Management	21-23	December 2016	Kozhikode
23	Urban Flooding and its Preparedness	04- 05	January 2017	Kozhikode
24	Wetland Conservation and Management	05-06	January 2017	Kozhikode
25	Introduction to QGIS and QSWAT	17-19	January 2017	Kozhikode
26	Introduction to Application of RS and GIS in Water Resources	07-09	February 2017	Kozhikode

Water Resources Management and Training Project (WBMTP)

# Profile of Training Courses Offered During 2016-17

. Planning of Water Sup	oly and Sanitation Projects
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Duration : 1 day	Date : 12 July 2016	Venue : CWRDM, Kozhikode
Course Coord	inators	
Er P Jayakuma	r & Er B Vivek	

#### Contents

Training Calender 2016-17

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. Introduction to Coastal Erosion Problems and Protection Measures in Kerala

Duration: 4 days Date: 18-21 July 2016

Venue: CWRDM, Kozhikode

## **Course Coordinators**

Er P K Abdulla & Er C Dinil Sony

#### Contents

Features of Kerala coast; wind systems; ocean waves measurement and analysis; wave mechanics; coastal processes; coastal environmental data collection and analysis; coastal regulation zone; planning and design of coastal protection works.

# **Expected Deliverables**

An exposure to the coastal erosion problems and possible solutions, with special reference to Kerala coast.

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Training Calendar 2016-17

#### **Target Participants**

Junior and middle level engineers from Irrigation, LSG and Harbour Engineering Departments.

3. Environmental Impact Assessment Process

Duration: 2 days

Date: 26-27 July 2016

Venue: CWRDM, Kozhikode

# **Course Coordinators**

Er P Jayakumar, Er B Vivek & Dr P Padmesh

#### 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, KSEB, Agri. & GW.

# 4. Solid Waste Management to Control Water Pollution

Date: 10 August 2016

Duration: 1 day

Venue: CWRDM, Kozhikode

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#### **Course Coordinators**

Er B Vivek & Er P Jayakumar

#### Contents

Present scenario of solid waste management in our country; solid waste management technologies; controlling pollution of water bodies by solid waste; legal aspects of solid waste disposal.

#### **Expected Deliverables**

To introduce the basic concept of solid waste management.

#### **Target Participants**

Members/ Councillors and BDO's of Panchayats/ Blocks/ Corporations.

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Training Calendar 2016-17

5. Worksho Managen	op on nent'	'Integrated	Water	Resources
Duration: 2 days	Date: 19	-20 August 2016		Venue: Kottavam

**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, CADA and KWA.

#### 6. Application of Decision Support System in Irrigation Management

Duration : 3 days Date: 25-27 August 2016

Venue: CWRDM, Kozhikode

#### **Course Coordinators**

## Dr U Surendran, Dr K Madhavachandran & Dr V P 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

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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.

# 7. Benchmarking of Irrigation Projects

Duration: 3 days Date: 29-31August 2016 Venue: CWRDM SC, Neyyattinkara

**Course Coordinator** 

## Er G K Ambili

## Contents

Overview of benchmarking; stages in benchmarking process; benchmarking indicators; water auditing ; case studies.

# **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.

#### Water Resources Management and Training Project (WRMTP)

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

Duration: 3 days Date: 29-31 August 2016 Venue: CWRDM, Kozhikode Course Coordinators

Dr C Unnikrishnan Warrier & Dr T R 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 hydro-geological 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 quasigovernment departments.

# 9. Advanced Techniques for Hydrological Investigations

Duration : 4 days Date: 27-30 September 2016 Venue: CWRDM, Kozhikode Course Coordinators

Dr A B Anitha & Er T K Drissia

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#### 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 ground water investigations; advanced techniques for measurement of soil erosion and reservoir sedimentation; advanced instrumentation for hydrological investigations; advanced computing techniques for hydrological 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.

# 10. Hydrologic Modelling for Water Resources Management

Duration: 3 days Date: 05-07 October 2016 Venue: CWRDM SC, Neyyattinkara Course Coordinators

Er G K Ambili & Dr Celine George

#### Contents

Introduction to hydrologic modeling; components of hydrologic modeling; 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.

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# 11. Strategies for Groundwater Development and Management

Duration : 3 days Date : 18-20 October 2016

Venue: CWRDM, Kozhikode

**Course Coordinators** 

Dr P R Arun, Dr C P Priju & Dr N B Narasimha Prasad

## Contents

Application of remote sensing and GIS; groundwater targeting – geophysical exploration; isotope techniques in groundwater studies; groundwater modeling; groundwater resources estimation; groundwater conservation strategies.

## **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.

# 12. Irrigation Water Management (Induction Course)

Duration : 1 Month Date: 17 October- 17 November 2016 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

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#### Training Calendar 2016-17

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.

## 13. Interaction between Shallow and Deep Aquifers

Date : 26-27 October 2016 Duration : 2 days

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.

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#### **Expected Deliverables**

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

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

## 14. Introduction to Flood Management

Venue: CWRDM, Kozhikoda Date : 02-04 November 2016 Duration : 3 days **Course Coordinators** 

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

#### Contents

Need for flood studies; statistical analysis; conventional techniques for flood frequency; importance and preparation; Emergency Evacuate Plan; an introduction to software MIKE 11 and HEC RAS; hands-on training ; coastal flooding.

#### **Expected Deliverables**

To give an introduction to the advancement in the technology used in studies related to flood management. This will help the junior and middle level engineers in Water Resources Department to know the new technologies in the field of water resources and hydrology. Enhance information of conventional and modern techniques used for the studies related to flood management.

## **Target Participants**

Junior and middle level Engineers from Irrigation Dept., LSGD, KSEB and other related Departments of State Govt. and Revenue Department.

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Venue: CWRDM, Kozhikode

# 15. Safe Water and Human Health

Date: 08-09 November 2016 Duration: 2 days **Course Coordinators** 

Dr P Padmesh & Er B Vivek

#### Contents

Challenges to clean water accessibility; importance of safe water for healthy living; integration of QMRA concepts in drinking water standards; application of molecular techniques in the identification of waterborne pathogens; waterborne and water related diseases and their preventive measures.

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## **Expected Deliverables**

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

## **Target Participants**

BDOs, Health Inspectors and VEO's of Panchayats/ Blocks/ Corporations.

16. Artificial Groundwater Recharge - Concepts, Planning and Techniques

Duration: 3 Days Date: 16-18 November 2016 Venue : CWRDM, Kozhikode Course Coordinators

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

#### 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; groundwater conservation techniques; roof-top rainwater harvesting – concept, components and feasibility; water quality and health; 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

#### Water Resources Management and Training Project (WRMTP)

#### Training Calendar 2016-17

Venue: Koothattukulam/ Emakulam

change and development pressures increase 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/ Hydrochemists/ Water Managers of GWD, Irrigation Dept., KWA, Agri. Dept., LSGD, KRWSA, CADA and SS & SCD.

# 17. Advanced Techniques for Hydrological Investigations

Duration : 4 days Date: 22-25 November 2016

**Course Coordinators** 

Dr Celine George & Dr George Abe

Contents

Same as that of course No.9

**Expected Deliverables** 

Same as that of course No.9

**Target Participants** 

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

# 18. Water Quality Monitoring Techniques

Duration : 5 days Date: 22-26 November 2016 Venue: CWRDM, Kozhikode

Course Coordinators

Dr P S Harikumar & Dr K Madhavan

#### Contents

Sample collection and preservation techniques; Physicochemical and bacteriological 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;

#### Training Calendar 2016-17

application of remote sensing and GIS in water quality monitoring; conventional and modern techniques in water treatment; health, hygiene and water quality.

# **Expected Deliverables**

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.; hands-on training on field and laboratory practicals on water sampling and analysis.

## **Target Participants**

Officers from KWA, GWD, SS & SCD, Pollution Control Board and Jalanidhi.

19. Integrated Watershed Management - Monitoring and Evaluation

Duration: 3 days Date: 06-08 December 2016 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, SC&SSD and CADA.

#### Water Resourcev Munagement and Training Project (WRMTP)

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## 20. Irrigation Water Management

Duration: 3 days Date: 07-09 December 2016 Venue: CWRDM, Kozhikode

**Course Coordinators** 

Dr K Madhavachandran & Er C M Sushanth

#### Contents

Introduction to agricultural water management; pressurized irrigation systems; design of drip irrigation; design of sprinkler irrigation; properties of soil; irrigation scheduling; irrigation scheduling using CROPWAT 8.0; evaluation of drip and sprinkler irrigation; problems associated with drip and sprinkler irrigation.

# **Expected Deliverables**

Knowledge on scientific irrigation management for crops, related to aspects such as irrigation methods (including drip and sprinkler); irrigation scheduling, soil properties etc. which will help the officials in implementing schemes/projects related to irrigation management.

#### **Target Participants**

Officers from Agri. Dept., SC&SSD, Irrigation Dept., LSGD, Commodity Boards and ICAR institutes within Kerala.

# 21. Water Supply and Sanitation

Duration: 3 days Date: 14-16 December 2016 Venue: CWRDM. Kozhikode

**Course Coordinators** 

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

#### 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 from LSGD, KWA, Jalanidhi, Municipalitites/ Corporations.

# 22. Introduction to Advanced Mapping Techniques for Water Resources Management

Duration: 3 days Date: 21-23 December 2016 Venue: CWRDM, Kozhikode

#### **Course Coordinators**

Dr V P Dinesan, Dr Girish Gopinath & Dr K. Ch. V.N Kumar

#### Contents

Remote sensing concepts; application of GIS and digital cartography in water resources management; google mapping techniques; application of Global Positioning System; Differential GPS; Total Station; bathymetric survey and introduction to mapping software.

#### **Expected Deliverables**

Conventional and advanced mapping techniques for water resources management enabling the participants to apply advanced concepts learnt during practical sessions in the field.

## **Target Participants**

Junior and middle level officers from Irrigation Dept., GWD, Agri. Dept., SC & SSD, KWA and Revenue.

# 23. Urban Flooding and its Preparedness

Duration: 2 days Date: 04-05 January 2017

Venue: CWRDM, Kozhikode

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#### **Course Coordinators**

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

#### Contents

Introduction to urban flooding; urban heat island effects; climate change and flash floods; introduction to Storm Water Management Model (SWMM) software; Hands on training on SWMM; Cities to Smart Cities.

#### **Expected Deliverables**

To give an introduction specific to urban flooding scenarios and

Water Resources Management and Training Project (WRMTP)

#### Training Calendar 2016-17

sharing information on how to be prepared to counter an urban flooding situation. Help the engineers, town-planners and other officials while planning, preparing, managing and evaluating an urban flooding situation from a more practical-professional angle.

## **Target Participants**

Engineers from Town Planning Dept, Junior and middle level Engineers from Irrigation, LSGD, Revenue and Municipalities/ Corporations.

# 24. Wetland Conservation and Management

Duration: 2 days Date: 05-06 January 2017 Venue:

2017 Venue: CWRDM, Kozhikode

**Course Coordinators** 

Dr P S Harikumar & Dr S Dipu

#### Contents

Wetlands of Kerala, need for conservation; hydrology of wetlands; biodiversity of wetlands; economic evaluation of wetlands; importance of soil and water conservation in wetland protection; environmental flows and its impacts on wetlands ; legal and institutional aspects of wetland conservation and management; CRZ notification and wetlands of Kerala; chemical and physical process in wetlands.

#### **Expected Deliverables**

Overview of the status of wetlands of Kerala; preparation of MAP of wetlands; methods for the conservation of wetlands; preparation of DPR for the conservation of wetlands.

#### **Target Participants**

Officers from Departments of Environment, Irrigation, SS & SC, Fisheries, KLDC, R & D Institutions and Biodiversity Board.

# 25. Introduction to QGIS and QSWAT

Date: 17-19 January 2017

Duration : 3 days

Venue: CWRDM, Kozhikode

#### **Course Coordinators**

Dr Celine George & Er G K Ambili

#### Contents

Introduction to QGIS; Preparation of maps in QGIS; SWAT -Overview; Introduction to QSWAT; Execution of QSWAT with examples.

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# **Expected Deliverables**

Exposure to hydrologic modeling, open source GIS and to use SWAT model for problem solving and decision making.

## **Target Participants**

Engineers and Officers working in the Irrigation Dept., Agri. Dept. and KWA.

# 26. Introduction to Application of RS & GIS in Water **Resources Management**

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

#### **Course Coordinators**

Dr Girish Gopinath, Dr V P Dinesan & Dr K. Ch. V.N Kumar Contents

General principles of remote sensing; data formats & data collection platforms; image processing and information extraction; GIS - basic principles; digital photogrammetry; case studies.

## **Expected Deliverables**

Exposure to the application potential of RS/GIS in various fields of water resources management. Hands on exercise with the process and software system involved.

#### **Target Participants**

Junior and middle level officers from Departments of Irrigation, GW, Agri., LSG, CADA, KWA and Revenue.

## ABBREVIATIONS

Irrigation Dept.	- Irrigation Department
LSGD	- Local Self Government Department
Agri. Dept.	- Agriculture Department
GWD	- Groundwater Department
KSEB	- Kerala State Electricity Board
KRWSA	- Kerala Rural Water Supply and
	Sanitation Agency
CADA	- Command Area Development Authority
KWA	- Kerala Water Authority
RDD	- Rural Development Department
SS & SCD	<ul> <li>Soil Survey &amp; Soil Conservation Department</li> </ul>
SC	- Sub Centre
KLDC	- Kerala Land Development
	Corporation

Course Coordinators and Contact Details	C	ourse	Coor	dinators	and	<b>Contact Detail</b>	s
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