

7. Training Module on Application of RS and GIS in Disaster Management

About the Course:

The course aims at developing skills and capacity of the officers working as disaster management teams to effectively use the remote sensing and GIS tools for manage different phases of disasters in districts.

Objectives:

- ✓ At the end of the course, participants will be able to;
- ✓ Define the disasters and identify the specific problems in the district
- ✓ Describe the RS, GIS and GPS
- ✓ Identify the features on satellite images
- ✓ Navigate using satellite image and GPS
- ✓ Assess the HRVC analysis using RS & GIS
- ✓ Improve the knowledge and skills for implementing functionalities of RS & GIS tools in disaster management

Methodology:

The course uses participatory techniques such as desk exercises, case studies, projects, demonstrations, action planning, micro-films and lessons.

Expected Outcome:

- Participants would prepare RS and GIS based HRVC maps for disaster management plan as follow up of the course.
- Apply RS and GIS tools for risk analysis.
- Practice and rehearse the implementation of mitigation, relief and response action plans

Target Group:

The target group for this programme would be district level officers and other functionaries from various line departments involved in the activities related to planning, design and construction of habitat.

Validation

Apart from daily assessment, the course will be validated by using immediate reaction questionnaires and oral feedback by the participants at the end of the course.

Contents:

The following five modules would constitute the course contents;

Module 1: Principles of disaster management and profile of Karnataka (Disasters, hazard, risks and vulnerability).

Module 2: An overview of country, state and district level administrative, institutional and techno-legal regime structure of disaster management.

Module 3: Remote sensing – Satellite images, interpretations, application in disaster management and ground truth verification.

Module 4: GIS software – Capabilities, different applications, usage in disaster management for preparedness planning.

Module 5: GPS technology – Concepts, positioning and applications.

Module 6: Disaster management plan – Maps generation using the dataset of district/state for resource identification/vulnerable areas/alternate routes/decision making etc.

Training Design on Application of RS and GIS in Disaster Management

Day 1 - Session 1 & II	
Topic	<i>Introductory Activity</i>
Contents	<ul style="list-style-type: none"> ✓ Introduction of Course Team and Faculty ✓ Introductory diversion ✓ Expectations of participants ✓ Expectations of trainers ✓ Overview and concept of the course
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Share experiences in Disaster Management • List expectations from the course • Introduce themselves • Set ground rules for the course
Expected Outcome	Listing of Expectations from the course Setting Ground Rules for Trainees and Trainers Limitations and scope of the training
Method	Introductory diversion Eliciting responses and Eliciting reactions
Process	<p>Resource persons to introduce themselves, welcome the participants warmly.</p> <p>Introductory games: Participants to pair up and talk to each other - about their work, their families, their interests, their hobbies, etc. Participants will then introduce their partners in the plenary, so that all other participants get to know each other.</p> <p>Resource persons to define the objectives of the course and elicit the expectations of the participants from the course. Based on the above, the resource team may reset the course objectives. It is important that the resource team provide space and time for the participants to freely share their experiences and opinions, since the issues that emerge from their experiences will form the basis of the objectives of the course.</p>
Performance Aids	Checklist, Flow Chart
Media	White Board/LCD Projector/PPT
Trainers	Course Coordinator and Faculty ATI
Time	01:00 Hours

Day 1 - Session II	
Topic	<i>Inaugural Session, About Disaster Management and Plan</i>
Contents	<ul style="list-style-type: none"> ✓ Disasters ✓ Preparedness ✓ Response & Rescue ✓ Rehabilitation ✓ Mitigation
Session Objective	To know the overall importance and development of the disaster Mitigation Strategies.
Expected Outcome	Identify the missing gaps and understand the needs of the plan to tackle the Disasters.
Method	PPT, Lesson, Case study discussion and Experience sharing
Process	Resource person will explain on importance of Disaster Management, and different steps of management process. And also highlight the use of RS, GIS and GPS technology for faster planning for disaster preparedness.
Performance Aids	Checklist
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Director General, ATI
Time	01:00 Hours
Day 1 - Session III	
Topic	<i>Vulnerability profile of Karnataka</i>
Contents	<ul style="list-style-type: none"> - Disasters in Karnataka - Hazard and vulnerability - Past disasters in Karnataka
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Identify Hazards and Vulnerability • Analyse HRV of the taluk/village • List the past disasters in the area
Expected Outcome	Will be able to prepare hazard, vulnerability and history of disasters

Method	PPT, Lesson, Case study
Process	The resource person will give the brief presentation on the past history on the disasters occurring in different district in Karnataka. This will be followed by a pictorial presentation by the resource person on hazards, risks, vulnerability and tools of risk assessment, steps to mitigate the impact of hazards. A few case studies will be illustrated during discussion.
Performance Aids	Checklist
Media	LCD Projector/PPT
Trainers	Faculty ATI
Time	01:00 Munitities
Day 1 - Session IV	
Topic	<i>National Disaster Management Act 2005, Implementation, Role & Responsibilities</i>
Contents	<ul style="list-style-type: none"> - Structure of Disaster Management Act - Role & Responsibilities of Officers
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • explain the salient features of the Disaster Management Act • Identify the role & responsibility
Expected Outcome	Application of provisions of the Act related to DDMP. Penalty, Roles and responsibilities of Officers, Line departments and DDMA
Method	PPT and Discussion/ Question answer
Process	The Resource Person will make a PPT on Disaster Management Act-2005. Following point will be covered in the presentation; <ul style="list-style-type: none"> • Background behind Disaster Management Act-2005 • Terminologies • Organizational structure for Disaster Management at District/ State/National levels • Roles of DDMA/SDMA • DDMP provisions • Roles and Responsibilities of DDMA/Departments/Officers • Penal provisions

Performance Aids	Disaster Management Act 2005
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Faculty ATI
Time	1:00 Hour
	Test for few minutes
Day 1 - Session V	
Topic	<i>An overview of RS & GIS in Disaster Management</i>
Contents	<ul style="list-style-type: none"> • Introduction to Remotes Sensing and GIS • Application of Remote sensing and GIS • Preparation of maps • Steps to adopt GIS
Session Objective	<p>Participants will be able to;</p> <ul style="list-style-type: none"> • Explain the uses of Remote Sensing and GIS in Disaster Management • Describe the steps in preparing maps/data base using GIS • Use of GIS in DDMP preparation
Expected Outcome	Will be able to explain the capabilities of Rs & GIS in different fields.
Method	PPT and Discussion/ Question & answer
Process	The RP will make a pictorial presentation on Remote sensing and GIS technology, applications and advantages through case studies and best practices. And also will explain its use in preparedness plan for disasters.
Performance Aids	Satellite imageries & GIS
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Faculty ATI
Time	1:00 hour
Day 1 - Session VI	
Topic	<i>Visit to Karnataka state Remote Sensing Application Centre, Mysore</i>
Contents	<ul style="list-style-type: none"> ➤ About KSRSAC ➤ Activities of KSRSAC ➤ Use of RS & GIS

	➤ Ongoing & future projects with KSRSA
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Explain the activities of KRSRAC • Describe the use of RS & GIS for different purposes • Explain the steps in preparing maps/data base using GIS
Expected Outcome	Participants will be able to describe the KRSRAC activities and capabilities developed use RS & GIS.
Method	PPT and Discussion/ Question & answer at the KRSRAC.
Process	Participants will visit KRSRAC with course coordinator and head of KRSRAC will explain about the organisation. He will make a PPT on the activities of KRSRAC, about RS & GIS, results of the projects undertaken and its usage etc. And also he will show the satellite imageries and maps being produced for different areas for visualisation.
Performance Aids	Satellite imageries & GIS maps
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Scientist, KRSRAC
Time	02:00 Hours
Day 2 - Session I	
Topic	<i>District Disaster Management Plan and Vulnerability Assessment</i>
Contents	<ul style="list-style-type: none"> - HRVC Analysis - Tools for risk assessment - Use of GIS - Steps in DDMP
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Explain HRVC • Apply tools for HRVC • Steps in DDMP • Outline for DDMP • Use of RS and GIS as tool for preparation and decision taking system
Expected Outcome	Will be able to analyze HRVC and prepare vulnerability maps using GIS.
Method	Presentations and Group Exercise

Process	The Resource Person will discuss the HRVC analysis and present the tools for HRVC analysis. This will be followed by Group activity on preparation HRVC analysis for four areas. Each group will do for one Taluk. This will be followed by presentation and preparation of an outline structure for District Disaster Management Plan. Groups will finally make the presentation of outline and GIS mapping utilities in DDMP.
Performance Aids	DDMP- Guidelines.
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Faculty ATI
Time	01:00 Hour
Day 2 - Session II	
Topic	<i>Introduction to Global Positioning System (GPS) and its applications</i>
Contents	<ul style="list-style-type: none"> ✓ Introduction to GPS ✓ Navigation ✓ Application & usage of GPS
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Explain GPS • Describe navigation & positioning • Methods of positioning • Apply tools for positioning
Expected Outcome	Will able to apply tools for positioning using GPS
Method	Presentation and Demo
Process	Resource person will explain about GPS technology, types, navigation, filed positioning, accuracy and its applications through presentation and demonstration of GPS equipment in the field.
Performance Aids	GPS equipment
Media	White Board/LCD Projector/PPT/ Hand outs
Trainers	Professor/Scientist, NIE/ISRO
Time	02:00 Hours
Day 2 - Session III	
Topic	<i>Interpretation of maps and its applications</i>

Contents	<ul style="list-style-type: none"> ✓ Concepts of maps ✓ Types of map ✓ Interpretation
Session Objective	<p>Participants will be able to;</p> <ul style="list-style-type: none"> • Describe maps • Identify the features • Explain the scale units • Describe the uses
Expected Outcome	Participants will be able to identify the ground features on the map for planning purposes.
Method	Presentations and group activities
Process	Resource person will explain the concepts of maps, types, identification of features, scale units and its applications. And also will explain the usage of topo maps in planning/management.
Performance Aids	Maps - cadastral, topo sheet etc.,
Media	White Board/LCD Projector/PPT/ Maps
Trainers	SSI/KSRSAC/Department of Geography/ISRO
Time	01:00 Hours
Day 2 - Session IV	
Topic	<i>Satellite Image Interpretation: Visual and Digital techniques and Damage Assessment</i>
Contents	<ul style="list-style-type: none"> ➤ Satellite images ➤ Image interpretation ➤ Digital techniques of crop assessment
Session Objective	<p>Participants will be able to;</p> <ul style="list-style-type: none"> • Explain satellite image • Describe types of images • Identify features on the image • Apply tools for crop assessment
Expected Outcome	Will be able to apply tools for identifying the features on a image/map.
Method	PPT, Lesson, Case study and Discussion
Process	The resource person will make a PPT on explaining satellite images, concepts, types, classifications, feature identifications and the

	availability of images etc. And also describe the different assessment techniques for example crop production and crop loss estimation.
Performance Aids	Handout/study material
Media	White Board/LCD Projector/PPT/ Maps
Trainers	KRSRAC/ ISRO/NRSA
Time	01:00 Hours
Day 2 Session V	
Topic	<i>Satellite Image Interpretation - Ground Truth Verification</i>
Contents	➤ Interpretation of image at field
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Identify ground features on image • Navigate using image • Assess the ground features
Expected Outcome	Will be able to interpret the ground features on the satellite image.
Method	Field visit, group discussion and ground verification
Process	The participant will be taken to an identified area on the satellite image by the resource persons. The participants will be guided to identify the features on the image with ground verification. And also they will use GPS for positioning themselves and relocate on the image accurately.
Performance Aids	Satellite images
Media	Satellite Maps, Top sheets/Cadastral Map, Brinton compass, GPS
Trainers	KRSRAC/ISRO/ATI
Time	02:00 Hours
Day 3 - Session I	
Topic	<i>ESRI - GIS in Disaster/Emergency Management</i>
Contents	<ul style="list-style-type: none"> ✓ Products of ESRI ✓ GIS software ✓ Capabilities of GIS
Session Objective	Participants will be able to; <ul style="list-style-type: none"> • Explain the products of ESRI • Describe the salient features of GIS • Explain the utilities of GIS in emergency management system

	during disasters
Expected Outcome	Participants will be able apply GIS tools for develop effective disasters emergency management system.
Method	PPT, Case study and Discussion
Process	The resource person will make a PPT for explaining GIS in global contest and ESRI role. He will also discuss the capabilities of GIS software being used in different areas by various departments and some best practices and case studies will also be discussed.
Performance Aids	Handouts
Media	White Board/LCD Projector/PPT/ Software Demo
Trainers	ESRI India
Time	02:00 Hours
Day 3 - Session II	
Topic	<i>Application of RS and GIS in Earthquake & Landslides</i>
Contents	<ul style="list-style-type: none"> ✓ Introduction to earthquake & landslides ✓ Terminologies ✓ History of earthquake and Landslides ✓ Assessment of hazard prone areas using RS and GIS
Session Objective	<p>Participants will be able to;</p> <ul style="list-style-type: none"> • Define, identify the causes and effects of earthquake & landslides • Identify earthquake & landslide hazard prone areas • Assess the damages using RS & GIS techniques
Expected Outcome	Will be able to identify the earthquake and landslide damage areas using RS & GIS.
Method	PPT, Micro-films, Case study and Discussions
Process	The resource person will make a PPT for explaining on the definition, types, causes and effects on the built environment. Earthquake and landslide hazard/damage assessment techniques using GIS will be explained with case studies.
Performance Aids	Checklist
Media	White Board/LCD Projector/PPT/ Software Demo
Trainers	Scientist ISRO/IIT/NITK

Time	02:00 Hours
Day 3 - Session III	
Topic	<i>Introduction to Google Maps</i>
Contents	<ul style="list-style-type: none"> ✓ Google earth & Maps ✓ Usage
Session Objective	<p>Participants will be able to;</p> <ul style="list-style-type: none"> • Describe google maps • Explain its usage • Locate features on the maps
Expected Outcome	Participants will be able to use google earth maps for locate ground features.
Method	PPT, hands on experience and discussion
Process	The resource person will explain Google Earth concept, tools and its usages and then the participants will be allowed to practice on the systems for identification/location of features use the system. The filed data collected using GPS etc by the participants will be located in the map.
Performance Aids	Computers
Media	GIS Computer Lab, Google earth software
Trainers	Faculty ATI
Time	02:00 Hours

Programme Schedule

Day/Sessions	Topic
Day 1 9.30 AM -10.30 AM	Registration Eliciting Expectations and Course Objectives
10.30 AM -11.30 AM	Inaugural Session: Disaster Management
11.45 AM - 12.45 PM	Vulnerability Profile of Karnataka
12.45 PM – 01.45 PM	National Disaster Management Act 2005, Implementation, Role & Responsibilities
02.30 PM – 03.30 PM	Overview of RS & GIS in Disaster Management
3.45 PM - 5.30 PM	Visit to Karnataka State Remote Sensing Application Centre, Mysore
Day 2 09.30 AM – 10.30 AM	District Disaster Management Plan and Vulnerability Assessment
10.30 AM – 11.30 AM	Introduction to Global Positioning System (GPS) and its applications
11.45 AM – 01.45 PM	Satellite Image Interpretation: Visual and Digital techniques and Damage Assessment
02.30 PM – 03.30 PM	Interpretation of maps and its applications
3.45 PM – 05.30 PM	Satellite Image Interpretation - Ground Truth Verification
Day 3 09.30 AM - 11.30 AM	ESRI - GIS in disasters/Emergency management
11.45 AM – 01.45 PM	Application of RS & GIS in earthquake and landslide
02.30 PM – 03.30 PM	Introduction to Google Maps
03.45 PM - 04.45 PM	Internal Validation