Coastal Resilience Planning and Management

COMPLETION REPORT

for Executive Development Programme - A-CUPCB-SPAV

16th March – 19th March 2026

Atal Mission for Rejuvenation and Urban Transformation

AMRUT Centre of Urban Planning for Capacity Building

A-CUPCB-SPAV

School of Planning and Architecture Vijayawada

Executive Summary

Executive Development Programme (EDP) on
"COASTAL RESILIENCE PLANNING AND MANAGEMENT"

Coasts are dynamic environmental regions which are continuously modified by the constant action of water and wind on land. Development pattern predictions around the world projects that Asia is likely to witness maximum increase in built-up areas and population concentration by 2030, a major percentage along the low-lying coastal stretches. The Indian coastline spanning 7,500 kilometres, including the mainland and the islands, is heavily concentrated with settlements, coastal industries, ports, major infrastructure investments, tourist destinations etc. within 50 kilometres from the ocean. Over the years the Indian coast is prone to the increasing frequency and intensity of coastal hazards such as tropical cyclones, storm surges, sea-level rise and coastal erosion. Considering the eco-system sensitivity, the vulnerability and the development significance of this environmental region; this common resource is often degraded and thus necessitates effective coastal resilience planning and management. This Executive Development Programme (EDP) aims to equip participants with the knowledge and skills required to develop and implement strategies that enhance the resilience of coastal regions and communities through effective planning and management. The EDP session will be highly interactive, combining theoretical knowledge with practical applications.
Objectives of the EDP:

a) To understand the concepts and principles of coastal resilience.
b) To identify and analyze the key hazards and vulnerabilities of coastal areas.
c) To learn about best practices and innovative solutions in coastal resilience planning and management.
d) To develop skills in creating and implementing coastal resilience plans.
e) To foster collaboration and knowledge sharing among stakeholders.

The training session is conducted over FOUR days, with each day dedicated to specific modules and activities. The EDP will be divided into the following modules 1-10. In addition, coastal resilience planning shall be explained through one case study.

Module 1: Coasts, Coastal Communities And Coastal Resilience
Module 2: Coastal Zone Ecology and Conservation
Module 3: Coastal Hazards, Climate Change & Compound Risk
Module 4: Coastal Governance – Planning & Regulatory Frameworks in India
Module 5: Coastal Hazards, Climate Change & Compound Risk
Module 6: Decision-Support tools for Coastal Planning
Module 7: Case Study
Module 8: Coastal Resilience Planning
Module 9: Sectoral Planning Applications
Module 10: DPR for Coastal Projects and Plans

The EDP utilizes a mix of instructional methods to ensure an engaging and comprehensive learning experience – Lectures, Presentations, Interactive Discussions, Group Activities/ Workshops/ Exercise, Case Studies Analysis, Field Visits (Optional). Basic Spatial software that can be used shall be introduced to the participants as part of the case-study explained.

This EDP is designed for Planners, Government officials, Policy-makers, Environmental/ coastal engineers, Disaster management professionals, NGOs, Academics and researchers in the field of coastal management. The Executive Development Programme on Coastal Resilience Planning and Management is highly relevant for urban local bodies, as it equips officials with essential skills and knowledge to effectively address coastal challenges, enhance resilience to climate change, and implement sustainable development practices in coastal urban areas. Urban Local Bodies (ULBs) are pivotal in Coastal Resilience Planning and Management due to their direct governance over urban coastal areas, where they are responsible for the implementation of local policies, develop and maintain resilient infrastructure, enforcement of regulations, engage communities, and collaborate with stakeholders to enhance the adaptive capacity of coastal urban areas and development of community-focused initiatives.

Mr. Rajeev R.
Principal Instructor
Assistant Professor, SPA Vijayawada

Dr. Arpan Paul Singh
Principal Co-Instructor
Assistant Professor, SPA Vijayawada

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EDP Day-wise Programme Schedule

DAY 1: Reporting and Inaugural Session	
09:00AM to 09:45AM	*Reporting of Participants and Registration Formalities* *Assembling of Participants in Lecture Room*
09:45AM to 10:30AM	*Welcome Address and Context Setting - Principal Instructor* *Introduction to the Centre of Excellence – Head, A-CUPCB-SPAV* *Inaugural Address – Director, SPA Vijayawada* *Introduction of the Participants and the SPAV EDP Session Trainers' Team* *Tea Break*
DAY 1	**UNDERSTANDING COASTAL SYSTEMS** - *The Problem Space and Planning Context*
Module 1	**Coasts, Coastal Communities and Coastal Resilience**
10:30AM to 12:00PM	• Definition & Understanding of Coasts • Coastal Zones and their significance – Geomorphology, Physical Characteristics, Ecology, Economy, Socio-Cultural etc. • Coastal Communities – Social and Settlement Characteristics • Introduction to Coastal Area Planning and Management – Principles, Concepts; Inter-disciplinary nature • Complexity of Coasts and Coastal Concerns • Coastal Resilience – Principles
Module 2	**Coastal Zone Ecology and Conservation**
12:00PM to 01:00PM	• Understanding Coastal Ecosystems and their Ecological Processes • Types/ Variety - Global, National and Regional • Assessing Coastal Habitats, Ecological Concerns and Ecological Vulnerabilities • Calculating Ecological Sensitivity • Conservation Strategies for preserving biodiversity and enhancing coastal ecosystem services – Global Best Practices
01:00PM to 02:00PM	**Lunch Break**
Module 3	**Coastal Hazards, Climate Change & Compound Risk**
02:00PM to 03:30PM	• Types of Coastal Hazards • Case Studies of Coastal Disasters • Climate projections and Relevance to Coastal Studies • Coastal Communities – Humanizing Risks • Compound Risks • Coastal Risks - Translating into economic and service losses
03:30PM to 03:45PM	**Tea Break**
Module 4	**Complexity of Coastal Governance in India**
03:45PM to 05:15PM	• Stakeholders of the Coasts • Contestations in Coastal Area Planning • Interface between Master Plans, Coastal Plans, and sectoral projects
DAY 2	**TOOLS AND TECHNIQUES FOR ASSESSING THE COAST** - *From Risk Understanding to Planning Solutions*
Module 5	**Coastal Vulnerability & Risk Assessment**
09:00AM to 11:15AM	• Understanding Vulnerability – Physical, Socio-Economic and Ecological • Identification of Vulnerability Parameters, Setting Weights

	• Vulnerability Assessment Methods – using literature/ case studies • Exposure–Sensitivity–Adaptive Capacity framework • Using vulnerability outputs for – Zoning; Infrastructure siting; Phasing of development etc.
11:15AM to 11:30AM	**Tea Break**
Module 6	**Decision-Support tools for Coastal Planning**
11:30AM to 12:30 PM	• Coastal mapping using GIS & RS • Drone technology for CRZ compliance; erosion mapping; post-disaster assessment
12:30PM to 01:30PM	• Shoreline Change Assessment -DSAS • InVEST Model for coastal ecosystem service valuation
01:30PM to 02:45PM	**Lunch Break**
02:45PM to 04:00M	• Community-based risk mapping and Stakeholder Engagement - Importance of Stakeholder Engagement - Collaborative Decision-making process and participatory approaches – Tools/ Techniques - Community-based solutions to Coastal Area Planning – with case examples
04:00PM to 04:30PM	**Group Activity/ Mock-Consultations**
04:15PM to 04:30PM	**Tea Break**
04:30PM to 05:15PM	• Orientation and Instructions for DAY 3: Field Visit - Introduce the field visit based Coastal Appreciation and Sensitization study • Coastal Audit familiarization
DAY 3	**FIELD VISIT** - *Observe real-world coastal challenges, solutions, and trade-offs*
Module 7	**Exploring Coastal Resilience Planning through Case-study**
08:45AM to 06:45PM	Start for field Visit
	Reaching Machilipatnam
	• Village/Site Visit in Case Area • Stakeholder Consultation, Coastal Village Audit; • Thematic Visits - Mangroves/ wetlands as buffers; Tourism or port-influenced coastal stretches etc. • Identifying Risk drivers; Existing responses; Planning gaps • Group reflection notes
	Return from Field and reaching Vijayawada by 06:00PM
DAY 4	**DEVELOPING A RESILIENT COAST** - *Envisaging Coastal Development, Project Implementation & Empowered Communities*
Module 8	**Coastal Resilience Planning**
09:00AM to 10:15AM	• What is Coastal Resilience? • Sustainability in Coastal Development- Balancing Economic Growth with Environmental Protection in Coastal Areas • India's Blue Economy - Coastal Economic Potential • Approach towards preparing a Resilient Coastal Development Plan • Integrating Climate Change Adaptation & Mitigation in Coastal Resilience Planning • Strategies for building Coastal Resilience
10:15AM to 10:30AM	***Introduction to Capstone Exercise*** *– Instructions*

Module 9	Sectoral Planning Applications
10:30AM to 11:00AM	• Blue Flag Beach Planning & Coastal Tourism
11:00AM to 11:30AM	• Resilient Coastal Infrastructure Planning & Engineering
11:30AM to 11:45AM	**Tea Break**
Module 10	**DPR for Coastal Projects and Plans**
11:45AM to 01:30PM	• Diversity of current and potential Coastal Projects in India • Financing mechanisms - Convergence of schemes, Climate finance, PPPs • Case-Based Discussion – 'Why coastal projects succeed or fail?' : Planning, design, governance failures • Components of a good Coastal DPR • Drafting RFPs for Coastal plans/ Vulnerability studies/ engineering works etc.
01:30PM to 02:30PM	Lunch Break
02:30PM to 03:45PM	**Capstone Exercise – From Risk to Project** *(Group-work)* Participants shall identify a coastal issue; choose suitable tools; propose a planning/project intervention; outline governance and financing approach Output: Short Concept PPT (3-4 Slides)
03:45PM to 04:15PM	Discussion/ Presentation and Open-Hour for Q&A
04:15PM to 04:30PM	Tea Break
04:30PM to 05:15PM	**Closing Discussions, Valedictory Session, Distribution of Certificates**

EDP: Trainers' Team

CHIEF PATRON	**Prof. Dr. Ramesh Srikonda** **Director, SPA Vijayawada**
PATRON	**Dr. Ayon Kumar Tarafdar** **Head, A-CUPCB & Professor, SPA Vijayawada**
EXPERTS/ TRAINERS	**Mr. Rajeev R.** **Principal Instructor - Assistant Professor, SPA Vijayawada**
	Dr. Arpan Paul Singh **Principal Co-Instructor - Assistant Professor, SPA Vijayawada**
	Dr. Anurag Bagade **Assistant Professor, SPA Vijayawada**
	Dr. J.M. Bhagwat **Assistant Professor, SPA Vijayawada**
	Mr. Mithun S Anand **Chief Technical Officer & Co-Founder, InnPACT Solutions, Delhi**
	Mr. Heerendra Kannan **Senior Urban Planner, IC Centre for Governance, Coimbatore**
	Mr. Aswinth Chandran **Sustainability Consultant, WSP-India, Bangalore**
	Prof. Dr. Abdul Razak M **Professor (Retd.), SPA Vijayawada**

About SPAV

The **School of Planning & Architecture, Vijayawada (SPAV)**, has been established as an autonomous Institution of National Importance (by the Ministry of Education, Government of India) under an Act of the Parliament of India. SPAV offers education in the fields of Planning and Architecture. The School has distinguished itself and has grown as a role model in the professional education, offering undergraduate, post graduate and doctoral programmes in the fields of planning and architecture, while at the same time fostering quality research in these domains.

SPA Vijayawada is ranked one of the best technical institutes in the country. The campus is green rated and is equipped with state-of-the-art infrastructure such as hostels, central library, ICT enabled teaching atmosphere, high end digital surveillance systems, modern laboratories, spacious studios, classrooms, open air theatres, auditorium, cafeteria, outdoor sports facilities, etc. The School is presently in the seventeenth year of operations and has two undergraduate degree programs – one each in Architecture (5 year B.Arch.) and Planning (4 year B.Plng.) and nine Masters degree programmes (specialising in 'Environmental Planning', 'Urban and Regional Planning', 'Transport Planning', 'Sustainable Architecture', 'Architectural Conservation', Building Engineering & Management', 'Landscape Architecture', 'Urban Design' and 'Master of Design') and doctoral programmes. It is a leading Institution in terms of Innovation, use of latest computing platforms, state of the art labs and a pedagogy that encourages critical thinking.

For more, please visit https://spav.ac.in/

About A-CUPCB-SPAV

The AMRUT Centre of Urban Planning for Capacity Building

The AMRUT Division of Ministry of Housing and Urban Affairs (MoHUA, Government of India) has recognised SPA Vijayawada as one of the few centers in the country, that shall undertake top notch, cutting edge research, projects, and training in the field of urban planning and climate sensitive development. SPA Vijayawada (Under Ministry of Education, Government of India) has entered into a MoU with MoHUA Govt of India, for setting up of the "AMRUT Funded Centre of Urban Planning for Capacity Building" at SPA Vijayawada (A-CUPCB-SPAV) .

This Centre is a hallmark of SPAV's capability, resources and potential in leading the path of research and advocacy in the domain of Urban Planning in India. The Centre is in the process of initiating cutting edge research and skill development, in the field of Urban Planning and Settlement Design. The Centre is presently in the process of being established. It has already initiated several projects and trainings in close coordination with some urban local bodies and think tanks in South India and is in the process of expanding its outreach in data driven applications and solutions for urban planning and climate sensitive design.

Session-wise Summary and Key Points

The 04-Day EDP Coastal Resilience Planning and Management organized by A-CUPCB-SPAV on commenced with the reporting and registration of participants, followed by the inaugural session held at the Conference hall in SPA Vijayawada Campus. The Inaugural session was graced by the Director of SPA Vijayawada, the Heads of both Departments of Architecture and Planning, and the Head of the AMRUT-CUPCB-SPAV. The session included a welcome address and context setting by the Principal Instructor, an introduction to the Centre of Excellence by the Head of A-CUPCB-SPAV, and the inaugural address by the Director of SPA Vijayawada. Participants and the trainers' team were also introduced, setting the stage for an interactive and collaborative training programme.

Figure 1,2,3 and 4: Inaugural Session

Session 1: Coasts, Coastal Communities And Coastal Resilience

The Session 1 handled by the Principal Instructor, Asst. Prof. Rajeev R. (SPAV), introduced the concept of coasts as dynamic interfaces between land, sea, and atmosphere, highlighting their ecological, economic, geomorphological, and socio-cultural significance. Coastal zones were explained as interconnected systems comprising offshore waters, beaches, estuaries, wetlands, and coastal lands influenced by marine processes and human interventions. The lecture discussed the importance of coastal ecosystems such as

mangroves, coral reefs, and wetlands in supporting biodiversity, shoreline protection, and livelihoods. The social and settlement characteristics of coastal communities in India were examined, with emphasis on vulnerability to erosion, cyclones, flooding, and saline intrusion. Case examples from Odisha and Andhra Pradesh illustrated the impacts of coastal hazards and displacement. Key coastal concerns along the Indian coastline, including shoreline erosion, sea-level rise, ecosystem degradation, pollution, and unregulated coastal development, were also discussed using relevant national statistics and examples.

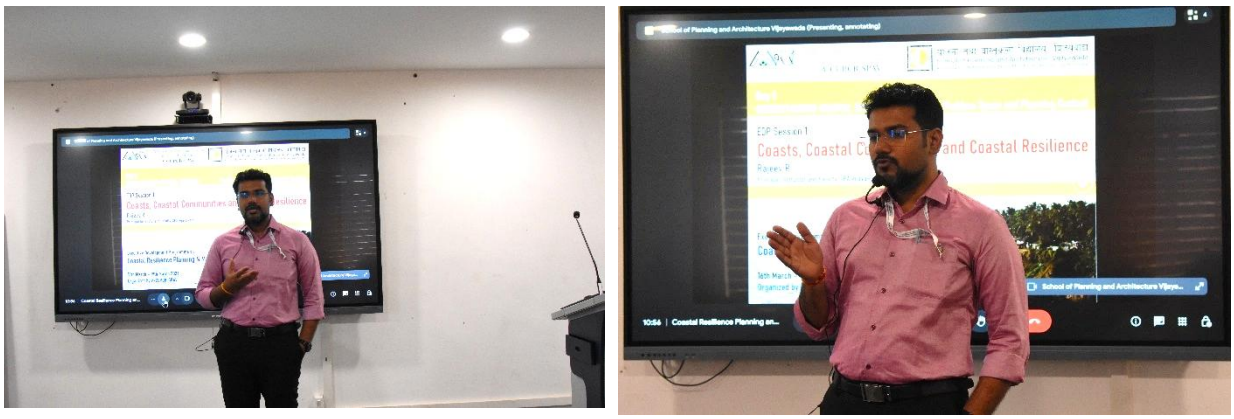


Figure 5,6: Session 1 by Asst. Prof. Rajeev R. (PI)

The session further introduced the principles of Coastal Area Planning and Management and Integrated Coastal Zone Management (ICZM), emphasizing interdisciplinary planning, stakeholder participation, and adaptive governance. The lecture concluded by explaining the concept of coastal resilience, focusing on risk reduction, ecosystem-based approaches, adaptive capacity, and integrated planning strategies for sustainable coastal development.

Session 2: Coastal Zone Ecology and Conservation

The Session 2 taken the Principal Instructor, Asst. Prof. Rajeev R. (SPAV). This session focused on understanding coastal ecosystems, ecological sensitivity, and conservation-oriented coastal planning approaches. It highlighted the ecological, economic, and social importance of coastal ecosystems such as mangroves, coral reefs, seagrass meadows, estuaries, and wetlands, emphasizing their role in shoreline stabilization, biodiversity conservation, carbon sequestration, fisheries support, and disaster risk reduction. Global, Indian, and Andhra Pradesh-specific examples, including the Sundarbans, Gulf of Mannar, and Coringa Wildlife Sanctuary, were discussed to explain ecosystem functions and emerging threats from urbanization, aquaculture, pollution, and climate change.

The session further introduced the concept of coastal ecosystem services and their valuation, demonstrating how economic valuation supports conservation and policy decisions. Case studies from India and international contexts illustrated the monetary significance of mangroves, wetlands, and coral reefs in storm protection, tourism, and fisheries. Technical methodologies for assessing coastal habitats and ecological sensitivity were also discussed, including the use of GIS, remote sensing, field surveys, ecological indicators, Multi-Criteria Decision Analysis (MCDA), and ecological sensitivity indexing. The application of vulnerability frameworks integrating exposure, sensitivity, and adaptive capacity was explained in the context of spatial planning and environmental zoning.

In addition, the lecture covered concepts of preservation, conservation, and utilization zones in coastal planning, drawing from global best practices in Integrated Coastal Zone Management (ICZM), ecosystem-based management, marine protected areas, and nature-based solutions. The session concluded by emphasizing the need for integrated, science-based, and participatory approaches to strengthen coastal resilience and ensure sustainable coastal development.

Session 3: Coastal Hazards, Climate Change & Compound Risk

This Session 3 was delivered by the Principal Co-Instructor, Asst. Prof. Dr. Arpan Paul Singh. He examined through this session the growing risks faced by coastal regions due to climate change, unplanned urbanization, and socio-economic vulnerabilities. It discussed major coastal hazards including cyclones, storm surges, tsunamis, coastal erosion, sea-level rise, flooding, and saltwater intrusion, highlighting their increasing intensity and frequency, especially along India's coastline. Case studies such as the 2004 Indian Ocean Tsunami, Cyclone Amphan, Fukushima Tsunami, and Kerala floods demonstrated how exposure, ecological degradation, and planning failures transform hazards into large-scale disasters. The session emphasized the concept of differential risk, showing that coastal risks vary spatially and socially based on geomorphology, ecosystem buffers, infrastructure, settlement patterns, and governance capacity. It further explored compound risks where multiple hazards interact simultaneously, amplifying impacts. Significant attention was given to the economic and ecosystem service losses caused by coastal hazards, including damages to infrastructure, livelihoods, ports, water supply, and biodiversity. The module concluded by stressing the need for dynamic, risk-informed, and ecosystem-based coastal planning approaches that integrate climate projections, nature-based solutions, vulnerability assessments, and adaptive spatial planning to enhance long-term coastal resilience.

Figure 7,8: Session 3 & 4 by Dr. Arpan Paul (Co-PI) (Left) and Mr. Heerendra Kannan (Right)

Session 4: Complexity of Coastal Governance in India

This session, handled by the trainer Mr. Heerendra Kannan, examined the challenges of coastal governance in India within the broader framework of Integrated Coastal Zone Management (ICZM). It highlighted how fragmented institutions, weak enforcement of Coastal Regulation Zone (CRZ) regulations, climate change impacts, and competing development pressures complicate sustainable coastal management. The evolution of coastal regulations in India from the CRZ Notification (1991) to the Integrated Coastal Zone Management Plan (ICZMP) was discussed alongside global coastal governance practices from countries such as the USA, Netherlands, Australia, and Sri Lanka. The session emphasized the importance of ecosystem-based

and participatory planning approaches supported by geospatial technologies, surveys, and multi-stakeholder coordination.

Special attention was given to coastal contestations, where conflicts emerge between environmental protection, infrastructure expansion, tourism, urbanization, and livelihood rights of fishing communities. The Chennai coast was discussed as a significant case study, illustrating contestations linked to port expansion, shoreline erosion, Ennore creek degradation, flooding, and displacement of traditional fishing settlements due to infrastructure and real estate development. These issues demonstrate how sectoral and project-based planning often intensify ecological vulnerability and social inequity. The session concluded that ICZMP provides a framework for resolving such conflicts through integrated, risk-informed, and community-oriented coastal planning.

Figure 9,10: Participants attending the session (Left) and Felicitation of External Expert (Right)

Session 5: Coastal Vulnerability & Risk Assessment

This Session 5 taken by Prof. Dr. Ayon Kumar Tarafdar focused on understanding coastal vulnerability and its role in risk-informed coastal planning. Vulnerability was discussed as a multidimensional concept comprising physical, socio-cultural, and environmental dimensions. Physical vulnerability includes exposure to hazards, while socio-cultural vulnerability highlights how marginalized communities are disproportionately affected due to poor access to resources and governance. Environmental vulnerability emphasized the degradation of natural buffers such as mangroves and coral reefs, which increases coastal risk.

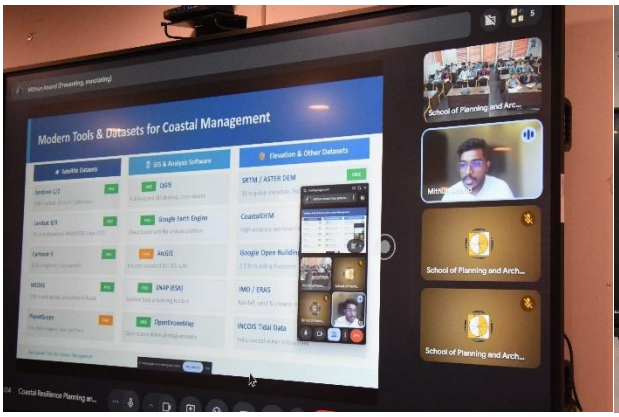
The session introduced various vulnerability assessment methods, including indicator-based approaches such as the Coastal Vulnerability Index (CVI), remote sensing and GIS-based spatial analysis, and participatory approaches involving local communities. Further, the Exposure–Sensitivity–Adaptive Capacity (E–S–AC) framework and composite coastal risk assessment approaches were explained to demonstrate how vulnerability can be translated into actionable risk-based planning decisions. The session also included a hands-on vulnerability assessment exercise for participants, enabling practical application of vulnerability mapping and risk prioritization concepts.


Figure 11,12: Session 5 by Prof. Dr. Ayon Kumar Tarafdar

Session 6: Decision-Support tools for Coastal Planning

The Session 6, had 3 speakers – Mr. Mithun S Anand, Mr. Aswinth Chandran and Dr. Abdul Razak M. These sessions on *Decision-Support Tools for Coastal Planning* introduced participants to advanced spatial and analytical tools that support evidence-based coastal planning and management.

The first session, handled by Mr. Mithun S Anand, focused on the application of GIS and Remote Sensing (RS) in coastal mapping, including land use analysis, hazard mapping, ecosystem identification, and spatial planning support. The session also highlighted the growing role of drone technology in Coastal Regulation Zone (CRZ) compliance monitoring, shoreline erosion assessment, and rapid post-disaster damage documentation, emphasizing its accuracy and utility in dynamic coastal environments.



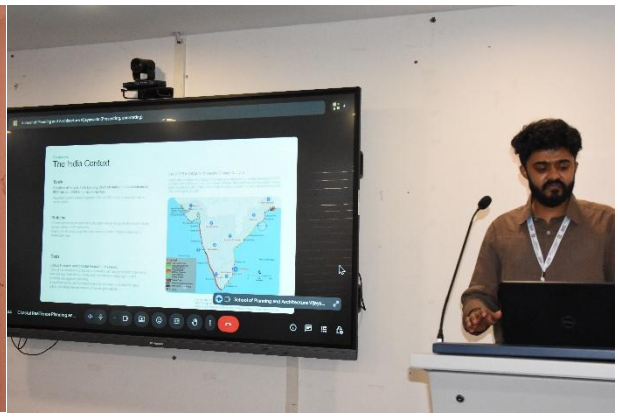


Figure 13,14: Session 6 by online Mr. Mithun Anand (Left) and the session by Mr. Aswinth Chandran

The second session, handled by Mr. Aswinth Chandran, covered shoreline change assessment using the Digital Shoreline Analysis System (DSAS), explaining how historical shoreline data and GIS-based transect analysis help identify erosion and accretion trends for informed coastal management. The session also introduced the InVEST model as a tool for assessing and valuing coastal ecosystem services such as coastal protection, biodiversity, and carbon sequestration. Together, the sessions demonstrated how integrated spatial decision-support tools can enhance resilience-oriented coastal planning, risk assessment, and sustainable development decision-making.

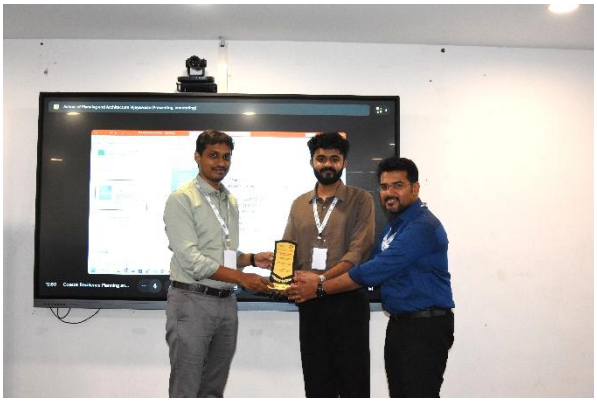



Figure 15,16: Felicitation of Expert and Session 6 by Dr. Abdul Razak M

The third talk under Session 6, handled by Dr. Abdul Razak, focused on community-based risk mapping and stakeholder engagement in coastal planning and management. The session emphasized the importance of involving diverse stakeholders including local communities, government agencies, NGOs, academia, and private sectors to ensure inclusive, transparent, and sustainable decision-making in coastal areas. Various participatory planning tools and techniques such as stakeholder analysis, Participatory GIS, focus group discussions, workshops, and participatory rural appraisal (PRA) were discussed as effective mechanisms for collaborative planning and consensus-building. The session also highlighted the role of community-based solutions in strengthening coastal resilience through initiatives such as mangrove restoration, fisheries management, pollution monitoring, and livelihood diversification under programmes like the Integrated Coastal Zone Management Project (ICZMP). Special emphasis was placed on adaptive management, inter-agency coordination, and participatory monitoring approaches, including citizen science and community-led evaluation systems. Through practical examples from India and international case studies, the session demonstrated how community participation enhances project implementation, accountability, and long-term sustainability in coastal governance.

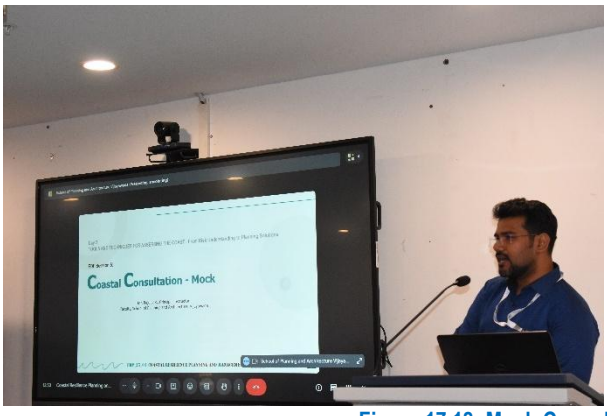


Figure 17,18: Mock-Consultation Session in progress

In continuation of the session, a role-play exercise was conducted by the PI, Asst. Prof. Rajeev R., to simulate community involvement in coastal planning and stakeholder negotiations. Participants assumed the roles of different stakeholders such as local communities, planners, government agencies, environmental groups, and private developers, enabling them to understand diverse perspectives, conflicts, and collaborative decision-making processes in coastal governance.

Figure 19,20: Mock-Consultation Session in progress

Figure 21: Day 2 – Group Photo with Expert

Session 7: Exploring Coastal Resilience Planning through Case-study

Session 7 focused on exploring coastal resilience planning through an intensive field-based case study visit to the Machilipatnam coastal region. The field visit covered Bandar Kota, Gilakaladindi Village, Machilipatnam Port, and Manginapudi Beach, providing participants with first-hand exposure to diverse coastal environments and development pressures. The exercise included village-level observations, stakeholder consultations, and coastal village audits to understand local livelihoods, vulnerability conditions, and existing adaptation responses.

Thematic visits enabled participants to examine the role of wetlands and coastal ecosystems as natural buffers, while also assessing tourism and port-influenced coastal stretches. Discussions and field observations helped identify key coastal risk drivers such as erosion, flooding, environmental degradation,

and unplanned development, along with associated planning and governance gaps. The session concluded with group reflection exercises, where participants documented field observations, stakeholder perspectives, and critical insights related to resilient and sustainable coastal planning practices.

Figure 22,23,24,25,26 and 27: Day 3 – Coastal Exposure Visit to Machilipatnam

Session 8: Coastal Resilience Planning

The session handled by Dr. Anurag Bagade focused on the principles, concepts, and strategies of sustainable and resilient coastal development. The session introduced sustainable development as a balanced approach integrating environmental protection, economic growth, and social equity, with emphasis on intergenerational equity, ecosystem conservation, and participatory governance. Coastal resilience was discussed as the ability of coastal systems, communities, and infrastructure to anticipate, absorb, adapt to, and recover from hazards such as cyclones, erosion, sea-level rise, and flooding. The session highlighted the importance of integrating resilience into spatial planning through vulnerability and risk assessments, ecosystem-based approaches, climate adaptation, and adaptive governance. Tools such as GIS, Coastal Vulnerability Index (CVI), remote sensing, simulation models, early warning systems, and decision-support systems were presented as critical instruments for evidence-based coastal planning. Global best-practice case studies demonstrated the effectiveness of nature-based solutions such as mangrove restoration, hybrid coastal protection systems, wetland conservation, and community-based management approaches. Overall, the session emphasized that resilient coastal planning requires integrated, adaptive, and participatory approaches to ensure long-term sustainability, reduced disaster risk, and balanced coastal development under changing climatic conditions.

Figure 28,29: Sessions by Dr. Anurag Bagade (Left) and Dr. J M Bhagwat (Right)

Session 9: Sectoral Planning Applications

Blue Flag Beach Planning

The session by Dr. Anurag Bagade focused on the concept of Blue Flag Beach Planning as a globally recognized eco-certification framework promoting sustainable coastal tourism, environmental management, safety, and public accessibility. The session explained the Blue Flag certification criteria administered by the Foundation for Environmental Education, covering environmental education, bathing water quality, environmental management, and safety standards. The discussion emphasized the importance of balancing tourism-driven economic growth with ecosystem conservation through initiatives such as India's BEAMS programme and eco-sensitive coastal planning approaches.

Resilient Coastal Infrastructure Planning & Engineering

The session by Dr. J M Bhagwat focused on the need for climate-resilient coastal infrastructure and integrated drainage planning in flood-prone coastal cities. The discussion highlighted how rapid urbanization, tidal influence, storm surges, and intense rainfall contribute to compound coastal flooding,

particularly in low-lying coastal regions. The session emphasized risk-informed planning, resilient drainage systems, adaptive infrastructure design, and nature-based solutions as essential strategies for reducing coastal flood risks and supporting sustainable urban development.

Session 10: DPR for Coastal Projects and Plans

The session 10 handled by Dr. Arpan Paul (Co-PI) emphasized that coastal corridor development and large-scale infrastructure projects must integrate environmental safeguards, climate resilience, and inclusive planning. International examples such as the Netherlands' "Room for the River," Singapore's Marina Barrage, and wetland restoration projects demonstrated how ecological restoration, adaptive infrastructure, and nature-based solutions can coexist with economic development. A major focus was placed on financing mechanisms for coastal projects, including scheme convergence, climate finance, public–private partnerships (PPPs), and multilateral funding. Discussions also highlighted why coastal projects succeed or fail, stressing the importance of scientific assessments, stakeholder participation, governance coordination, and adaptive planning.

Figure 30,31: Session by Dr. Arpan Paul Singh

The concept of an "Ideal Coastal DPR (Detailed Project Report)" was introduced, covering essential components such as baseline studies, hazard and vulnerability assessments, climate integration, ecosystem service valuation, financial analysis, governance frameworks, regulatory compliance, and monitoring mechanisms. The session further discussed the role of well-structured RFPs (Request for Proposals) in ensuring technically sound, environmentally responsible, and implementation-oriented coastal development projects.

Capstone Exercise – From Risk to Project (Group-work)

The Capstone Exercise provided participants with a hands-on opportunity to apply concepts and tools discussed throughout the programme to real-world coastal planning challenges. Working in groups, participants identified a key coastal issue, selected appropriate assessment and planning tools, and developed a conceptual planning or project intervention addressing resilience, sustainability, and risk reduction. The exercise also encouraged participants to consider governance mechanisms, stakeholder involvement, and possible financing approaches for implementation. Each group presented their ideas

through a concise 3–4 slide concept presentation, demonstrating integrated and practical approaches towards coastal resilience planning and management.

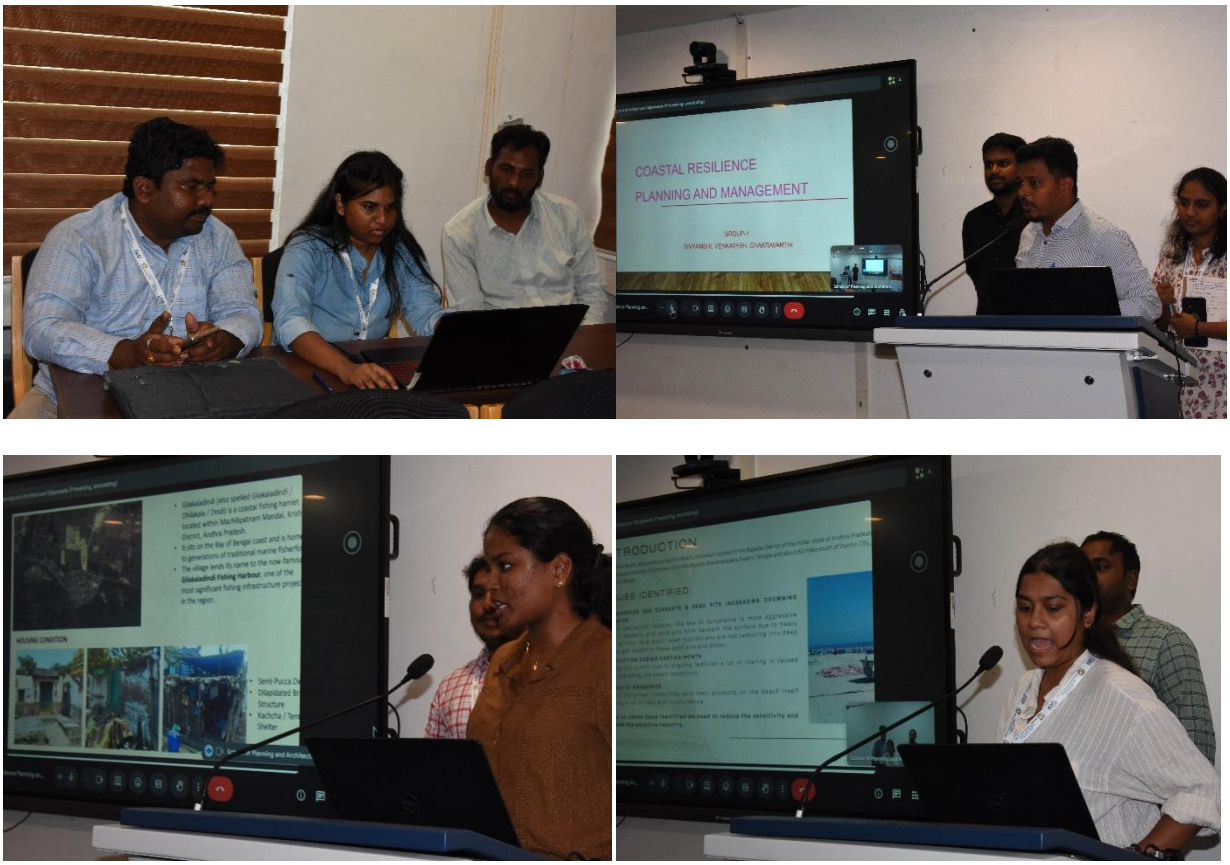


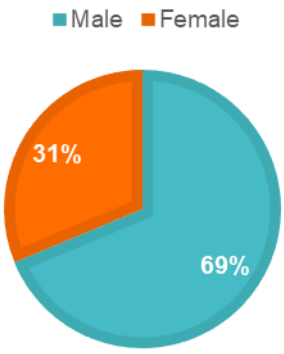
Figure 32,33, 34 and 35: Capstone Exercise Presentations by Participants

PARTICIPANT PROFILE

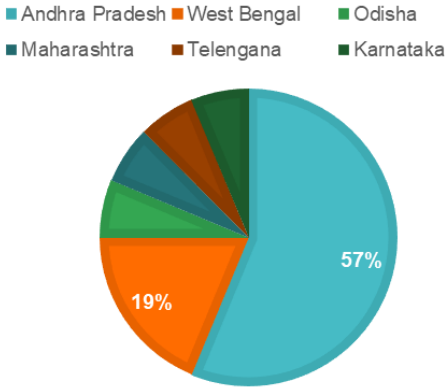
S.No.	Name	Gender	Nativity	Designation	Sector	Email ID
1	Kumbhakonam Venkatesh	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	venkatesh.rkv@gmail.com
2	Chakravarthy Karumuri	Male	Andhra Pradesh	Independent Architect	NGO/ Independent Consultant	chakravarthykarumuri20@gmail.com
3	Niharika N.N	Female	Karnataka	Independent Architect	NGO/ Independent Consultant	niharikann10@gmail.com
4	Ram Kunapareddy	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	ramasesharao.k@gmail.com
5	Y Divyamshi	Female	Telengana	Young Planner and Research Scholar	Government	divyamshi08@gmail.com
6	Vinay Vikas Gawali	Male	Maharashtra	Independent Architect	NGO/ Independent Consultant	vinugawali11@gmail.com
7	Debasmita Bhowmik	Female	West Bengal	Young Planner and Research Scholar	Government	debasmitaworks99@gmail.com
8	Jayanth Mula	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	jayanthmula7@gmail.com
9	Arpan Bhowmik	Male	West Bengal	Independent Architect	NGO/ Independent Consultant	work.arpan2000@gmail.com
10	Ganagala Janakiramayya	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	ganagalajd@gmail.com
11	N.Sai Venkata Ishwarya	Female	Andhra Pradesh	Young Planner and Research Scholar	Government	2240300185@spav.edu.in
12	Bandi Benny Blessed	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	bennytenson@gmail.com
13	Hrishav Bhattacharyya	Male	West Bengal	Independent Architect	NGO/ Independent Consultant	2250400252@spav.edu.in
14	Nilanjana Palit	Female	Odisha	Independent Architect	NGO/ Independent Consultant	nilanjana16.palit@gmail.com
15	Nagagopi Kalam	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	nagagopi019@gmail.com
16	Kanakam Roop Kumar	Male	Andhra Pradesh	Officer, MAUD, GoAP	Government	kanakam.roopkumar@gmail.com

Participant Diversity

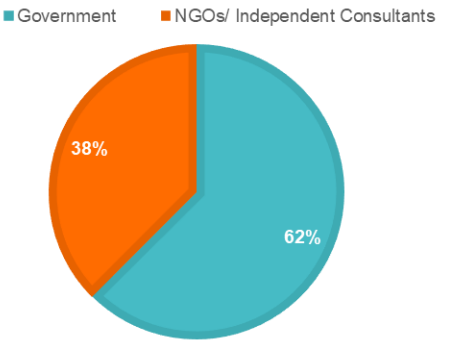
Gender Diversity



State of Nativity



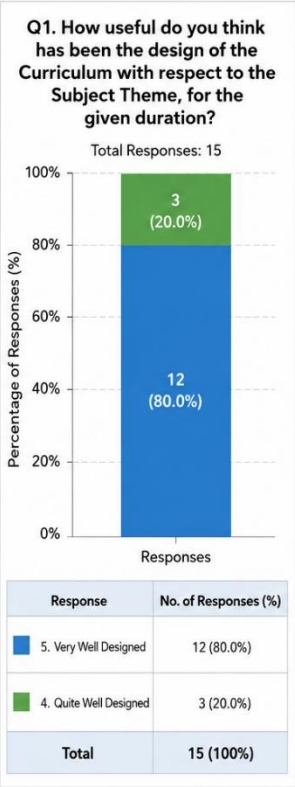
Job Sector



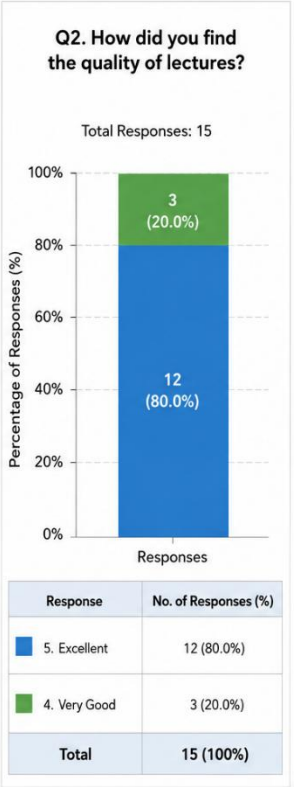
PARTICIPANT FEEDBACK

The Participant Feedback was obtained through Google Forms which was circulated to participants through email form the A-CUPCB-SPAV. A summary of the feedback received from the participants is presented below.

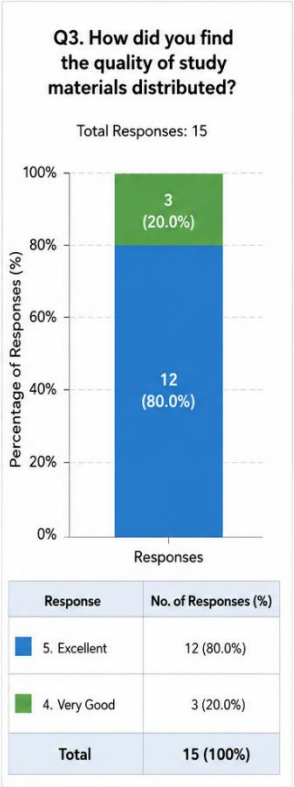
The participants agreed that sessions included a mix of in-depth lectures and introductions to emerging fields of study. The students felt that this variety allowed them to gain insights ranging from foundational knowledge to professional-level understanding. The combination of academic and practical learning made the workshop both informative and enriching.One of the highlights was the field study component, which offered hands-on learning opportunities and facilitated meaningful interactions with villagers. Another standout feature was the stakeholder role-play activity, which students found both informative and engaging. The workshop also emphasized weak governance issues in India. Students felt that this helped connect theoretical concepts to real-life scenarios. This focus on governance challenges resonated deeply with participants, as they could relate the discussions to their own experiences. These interactive elements provided a dynamic learning experience, encouraging active participation and critical thinking.



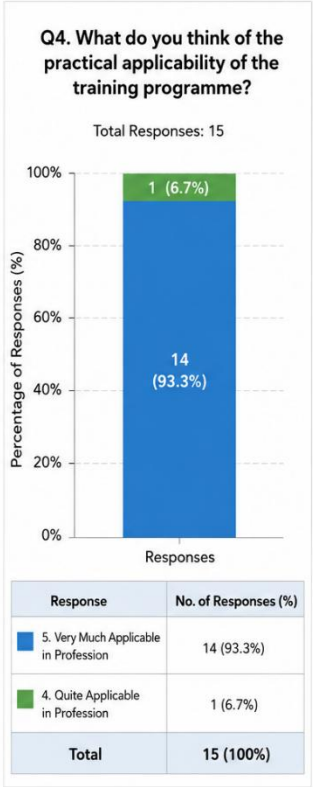
Response	No. of Responses (%)
5. Very Well Designed	12 (80.0%)
4. Quite Well Designed	3 (20.0%)
Total	15 (100%)



Response	No. of Responses (%)
5. Excellent	12 (80.0%)
4. Very Good	3 (20.0%)
Total	15 (100%)



Response	No. of Responses (%)
5. Excellent	12 (80.0%)
4. Very Good	3 (20.0%)
Total	15 (100%)

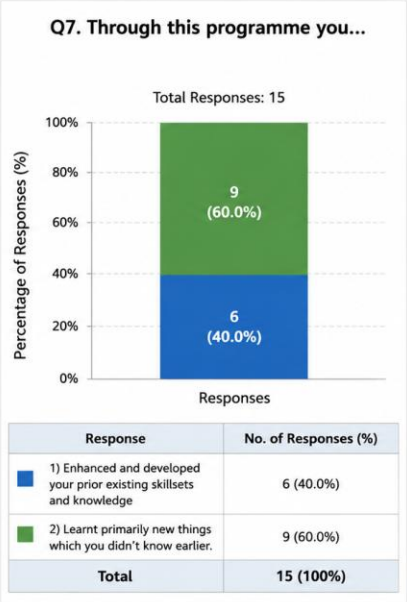


Response	No. of Responses (%)
5. Very Much Applicable in Profession	14 (93.3%)
4. Quite Applicable in Profession	1 (6.7%)
Total	15 (100%)

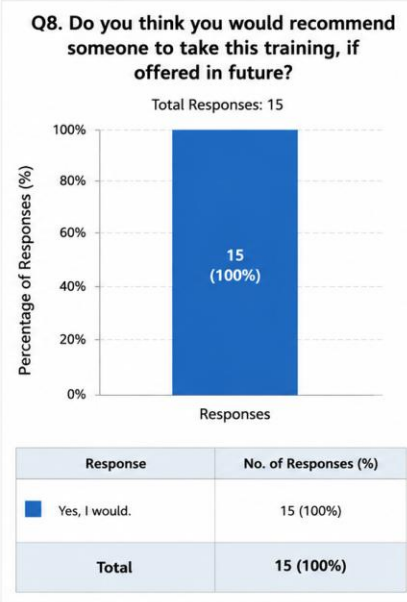
Participants particularly appreciated the practical and application-oriented components of the programme. The field visits and onsite inspections, especially to the Machilipatnam port area, were widely regarded as highly informative and valuable for understanding real-world coastal issues. Hands-on exercises, vulnerability assessment activities, software and tool demonstrations such as InVEST, DSAS, GEE, and GIS, along with group discussions and assignments, significantly enhanced participant engagement and learning outcomes. Many participants also highlighted the detailed lectures, interactive delivery methods,

and the integration of classroom learning with practical exposure as major strengths of the programme, helping them gain deeper insights into coastal resilience planning and its professional applicability.

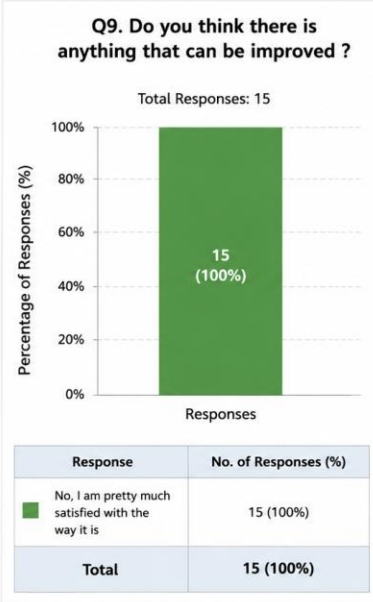
Participants expressed strong interest in gaining deeper knowledge and practical expertise in coastal risk and vulnerability assessment, including shoreline change analysis, coastal erosion studies, and resilience planning. Many participants specifically highlighted the need for advanced exposure to decision-support tools and software such as GIS, DSAS, InVEST, GEE, and related mapping applications, preferably through more intensive computer lab-based practical sessions. Interest was also shown in DPR preparation, vulnerability management, coastal planning tools, and Blue Flag beach planning concepts, particularly regarding sustainable coastal tourism and the blue economy. Field-based learning, practical case applications, and spatial analysis exercises were identified as areas participants would like to explore further in future programmes.



Response	No. of Responses (%)
1) Enhanced and developed your prior existing skillsets and knowledge	6 (40.0%)
2) Learnt primarily new things which you didn't know earlier.	9 (60.0%)
Total	**15 (100%)**



Response	No. of Responses (%)
Yes, I would.	15 (100%)
Total	**15 (100%)**



Response	No. of Responses (%)
No, I am pretty much satisfied with the way it is	15 (100%)
Total	**15 (100%)**

Overall, the workshop successfully blended academic rigor with practical application, leaving a lasting impact on the attendees.

VALEDICTORY & CERTIFICATE DISTRIBUTION

The Director and the Head, A-CUPCB-SPAV, along with the PI, Co-PI and Trainers together presented the participants with their participation certificates and momentos for their successful completion of the EDP. Followed by which, the PI, Asst. Prof. Rajeev R. proposed the Vote of Thanks. After this a group photo was taken. Few photographs of this session is placed below.






Figure 36 (Top Left): Closing Remarks in Valedictory Session by EDP PI, Asst. Prof. Rajeev R. (SPAV),
Figure 37 (Top Right): Address by Chief Parton, Director-SPAV, during the Valedictory session,
Figure 38 (Middle Left): Feedback session with the EDP Participants
Figure 39, 40 and 41 (Clockwise from Middle Right): Presentation Certificates to EDP Participants

Executive Development Programme (EDP) on

COASTAL RESILIENCE PLANNING AND MANAGEMENT

Figure 42: Group Photo – EDP Participants and SPAV Trainers: Coastal Resilience Planning and Management