



CENTRE OF EXCELLENCE
Socio-Environmental Sustainability for River Sand - Mining
SEnSRS

NEWSLETTER

VOLUME 1 EDITION 2

OCTOBER - DECEMBER 2025



CLIMATE-RESILIENT HYDROLOGY AND CRYOSPHERE RESEARCH



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Sensrs



About SEnSRS

IIT Ropar



Sensrs is a Centre of Excellence at IIT Ropar focused on socio-environmental sustainability for river sand-mining regions. It integrates remote sensing, geospatial analysis, field studies, and policy support to enable evidence-based monitoring, ecological protection, and responsible resource governance.



Prof. (Dr.) Rajeev Ahuja

Director
IIT Ropar, Punjab

A message from the Director, IIT Ropar

It gives me immense pleasure to present the **SEnSRS Newsletter (October–December 2025)**, showcasing the academic, research, and capacity-building initiatives of the **Centre of Excellence for Socio-Environmental Sustainability for River Sand Mining (SEnSRS), IIT Ropar**.

During this quarter, the Centre successfully organized the **19th Project Advisory and Monitoring Committee (PAMC) Meeting on Hydrology and Cryosphere**, facilitating meaningful discussions on climate-resilient hydrology, glacier and snow processes, groundwater–surface water interactions, and the use of advanced tools such as AI and remote sensing for sustainable water management.

SEnSRS also demonstrated a strong commitment to **skill development and emerging technologies** through the **AICTE-supported Drone Training Programme**, providing hands-on exposure to drone assembly, flying, and certification. In addition, the **Faculty Development Programme on Drone Technologies and Intelligent Systems** strengthened academic capacity by integrating AI, IoT, and aerial platforms into teaching and research.

The **field visit to Prashar Lake** further enriched experiential learning by linking scientific understanding with ecological and cultural perspectives. I commend the SEnSRS team for their dedicated efforts and wish them continued success in advancing sustainable, science-driven solutions.

Best Regards,
Prof. (Dr.) Rajeev Ahuja





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Dr. Reet Kamal Tiwari

Head & Associate Professor
Department of Civil Engineering
Centre Coordinator, SEnSRS
IIT Ropar, Punjab

As we conclude the final quarter of 2025, I am happy to reflect on a phase of **active learning, collaboration, and capability building** at the Centre of Excellence for Socio-Environmental Sustainability for River Sand Mining (**SEnSRS**), IIT Ropar.

This period was defined by **hands-on engagement and knowledge exchange**. Our focus extended beyond research discussions to strengthening technical competencies and real-world understanding. The **AICTE-supported drone training and certification programme** empowered participants with practical UAV skills, while the **Faculty Development Programme on Drone Technologies and Intelligent Systems** created an interactive platform for faculty to explore AI-enabled aerial applications and data workflows.

Equally significant was the field visit to Prashar Lake, which offered an immersive experience in observing hydrological systems, geomorphology, and ecological processes within a natural and cultural landscape. Such field-based learning remains central to our approach of connecting theory with practice.

These activities reflect SEnSRS's emphasis on **capacity building, experiential learning, and interdisciplinary exposure**. I sincerely appreciate the enthusiasm of participants and the dedication of our team. We look forward to expanding these efforts and nurturing innovation, skills, and sustainability-driven research in the coming months.

Best Regards,
Dr. Reet Kamal Tiwari





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Dr. Sartajvir Singh Dhillon

Chief Scientific Officer,
Centre of Excellence, SEnSRS
Socio-Environmental Sustainability in River Sand Mining
IIT Ropar, Punjab

The October–December 2025 period has been an energizing phase of **technical advancement and applied learning** at **SEnSRS, IIT Ropar**. Our focus during this quarter was to strengthen the **science–technology interface**, ensuring that research, training, and field activities directly contribute to practical and scalable outcomes.

A major emphasis was placed on **technology-driven capacity building**, particularly through the AICTE-supported drone training and certification programme, where participants gained hands-on experience in UAV assembly, flight operations, and data acquisition. In parallel, the Faculty Development Programme on Drone Technologies and Intelligent Systems explored the integration of **AI, ML, and IoT with aerial platforms**, highlighting data pre-processing, post-processing, and intelligent analytics for real-world applications.

While technical training remained central, experiential exposure through the Prashar Lake field visit enabled participants to observe hydrological and geomorphological processes in a natural setting, reinforcing the value of field validation alongside digital and analytical tools.

These initiatives reflect our commitment to **applied research, skill-oriented learning, and technological innovation**. I appreciate the efforts of the SEnSRS team and collaborators in delivering these programmes and look forward to further advancing impactful, technology-led solutions for environmental sustainability.

Best Regards,
Dr. Sartajvir Singh Dhillon





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19th PAMC Meeting on Hydrology and Cryosphere

Day 1 | October 27, 2025



Day 1 focused on **ongoing projects** exploring cloud microphysics, isotope hydrology, debris-covered glaciers, and regional hydrological evolution. New project proposals emphasized **basin-scale hydrological modeling**, integration of **machine learning with hydrodynamics**, digital twins for water management, and groundwater-surface water assessments. Presentations highlighted **floodplain dynamics, catchment-scale water management, and snowpack optimization** for climate resilience.





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19th PAMC Meeting on Hydrology and Cryosphere Day 2 | October 28, 2025

Day 2 centered on **glacier, snow, and permafrost processes**. Key discussions included **permafrost modeling**, glacier delineation using AI, seismic monitoring of glaciers and glacial lakes, and snow–glacier hydrology under climate change. Integrated approaches combining **remote sensing, in-situ measurements, and AI-based modeling** were presented to enhance **hazard assessment, water resource sustainability, and climate adaptation**.





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AICTE QIP PG Drone Training Programme

5 December 2025



In December 2025, AICTE conducted a hands-on training programme on **Dismantling, Assembling, and Drone Flying** to strengthen practical skills and capacity building in emerging UAV technologies. The programme provided participants with in-depth exposure to **drone hardware components**, their assembly and dismantling processes, and the fundamentals of **flight control systems**.

Through guided practical sessions, participants learned about **safety protocols, calibration, basic maintenance, and real-time flight operations**, gaining a clear understanding of how drones are deployed for applications such as **surveying, mapping, environmental monitoring, and data collection**. The training emphasized experiential learning, enabling participants to bridge the gap between theoretical knowledge and real-world drone operations.

This initiative reflects AICTE's continued commitment to **skill development, technological innovation, and experiential education**, equipping students and researchers with industry-relevant competencies in unmanned aerial systems.





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Certification Awarding Session

11 December 2025



A hands-on training programme on “Dismantling & Assembling of Drones and Drone Flying” was conducted in December 2025 with **AICTE support**. The programme provided participants with practical exposure to drone components, assembly techniques, safety protocols, and live flying sessions. Participants gained essential skills in drone operation and real-world applications. **Certificates were awarded to all successful candidates**, recognizing their participation and skill development in UAV technology.





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Field Visit to Prashar Lake

12 December 2025

As part of an academic and experiential learning initiative, participants undertook **a field visit to Prashar Lake**, a renowned high-altitude freshwater lake in Himachal Pradesh. The visit provided an opportunity to observe the **natural geomorphology, hydrological features, and ecological setting** of the lake and its surrounding landscape.

The visit also encouraged appreciation of **cultural heritage**, with discussions on the historical significance of the Prashar Rishi Temple and the role of local traditions in environmental stewardship.

Overall, the Prashar Lake visit enriched learning, fostering **environmental awareness, interdisciplinary understanding, and experiential engagement with nature**.





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Integration with GIS, AI & Remote Sensing



- GIS-based spatial analysis
- AI/ML for pattern detection & prediction
- Satellite + Drone data fusion
- Automated reporting dashboards
- **Outcome:** Smarter decision-making & early warning systems

Drones in River Sand Mining



Key Applications

- Identification of legal & illegal mining
- Volume estimation of extracted sand
- River morphology & channel shift analysis
- Monitoring of buffer zones & no-mining areas
- Replenishment studies

Benefits

- Transparency in mining operations
- Supports DSR, EC & EMGSM compliance

Faculty Development Programme on Drone Technologies and Intelligent Systems

18 December 2025

A Faculty Development Programme (FDP) titled “**Drone Technologies and Intelligent Systems: Integrating AI, IoT & Aerial Platforms**” was successfully conducted on 18 December 2025 in online mode (Zoom). The programme aimed to enhance faculty understanding of emerging drone technologies and their integration with **Artificial Intelligence (AI)**, **Machine Learning (ML)**, and **Internet of Things (IoT)** frameworks.

The **afternoon session** was delivered by **Dr. Sartajvir Singh**, Chief Scientific Officer, CoE-SEnSRS, IIT Ropar, who served as the **Resource Person**. The session focused on **Drone AI-ML applications**, covering both **pre-processing and post-processing of aerial data**. Participants gained insights into intelligent data workflows, analytics, and real-world use cases of drones in research and applied domains.

The FDP provided a valuable platform for academic professionals to interact with domain experts, strengthen conceptual clarity, and stay updated with advancements in **intelligent aerial systems**. The session contributed significantly to capacity building and knowledge enhancement in the rapidly evolving field of drone-based technologies.





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📍 C-114, SAB

Indian Institute of Technology
Rupnagar, Punjab 140001



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Patron :

Prof.(Dr.) Rajeev Ahuja
Director, IIT Ropar, Punjab

Editor-In- Chief :

Dr. Reet Kamal Tiwari
Centre Coordinator, SEnSRS

Editor :

Dr. Sartajvir Singh Dhillon
Chief Scientific Officer, SEnSRS

Co-Editors :

Dr. Naveen James
Dr. Navin Gopinathan
Dr. Shrey Pathak
Dr. Sreekumar Jayadevan
Co-Coordinator, SEnSRS

Contribution Team :

Dr. Vishakha Sood
Project Scientist, SEnSRS

Dr. Swati Sharma
Senior Scientist, SEnSRS

Mr. Arush Sharma
Technical Supervisor, SEnSRS

Mr. Ashish Maurya
Senior Field Surveyor, SEnSRS

Ms. Apoorva Sharma
Data Scientist, SEnSRS

Mr. Md. Hamidur Rahman
GIS Scientist, SEnSRS

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Mr. Shreekuttan E
Research Assistant, ICSSR

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Mr. Amritesh Singh
Field Investigator, ICSSR

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Mr. Mohit Thakur
Mr. Randeep Singh
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Office executive, SEnSRS

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Office Attendant, SEnSRS

