

# An Insight from Organizing CLImbing for CLImate GEOspatial School (CLIGEOS-2024) in Mountainous Regions

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## Abstract

This paper delves into the multifaceted experiences and insights garnered from organizing a short-term training programme aimed at professionals, students, academics, and climate enthusiasts. The programme, named CLImbing for CLImate GEOspatial School (CLIGEOS-2024), was a collaborative effort by the International Society of Photogrammetry and Remote Sensing (ISPRS) and ISPRS Student Consortium (ISPRS-SC) alongside Center for space science and geomatics studies (CSSGS) Pashchimanchal campus, Institute of Engineering, Tribhuvan University, Nepal, Universita' Degli Studi Di Udine, Italy and L J University, India aimed at addressing environmental challenges, particularly in hill and mountain regions. Despite facing logistical and communication hurdles due to the geographical dispersion of organizing institutions, the event successfully brought together participants with backgrounds in GIS, remote sensing, agriculture, and forestry. The programme was structured to promote participatory learning and project-based learning methodologies, incorporating classroom teaching, hands-on activities, fieldwork, data collection, short projects, quizzes, and evaluation mechanisms. Through a meticulously planned sequence, participants engaged in theoretical lectures, practical sessions on drone technology, industry expert presentations, and a mountain trek to observe climate change phenomena first-hand. Despite challenges related to infrastructure, including limited internet connectivity and access to data, the programme served as a catalyst for raising awareness about climate change and promoting sustainable practices. Key takeaways highlighted the importance of spatial data analysis, interdisciplinary collaboration, and hands-on learning in advancing solutions for sustainable development. The paper concludes with lessons learned from the programme, providing insights for future initiatives aimed at capacity building and knowledge dissemination.

## 1. Introduction

### 1.1 Training and Capacity Building

Short-term training programmes are pivotal instruments for nurturing capacity, disseminating knowledge, and honing skills across diverse fields (Dobos et al., 2018; European Commission, 2020). However, the orchestration of such programmes entails navigating a labyrinth of challenges. These obstacles encompass logistical intricacies, the kaleidoscopic tapestry of participant backgrounds, and the formidable spectre of infrastructure constraints, all of which exert a profound influence on the efficacy and success of these initiatives (Gupta & Srikant, 2019; Kapoor & Sharma, 2021).

This research paper embarks on an exhaustive exploration of the experiences, hurdles, and insights gleaned from a specific short-term training programme. By peering into the genesis of the programme, elucidating its objectives, unravelling its structural framework, scrutinizing participant perspectives, addressing infrastructural bottlenecks, and distilling pragmatic lessons learned, this paper endeavours to furnish actionable recommendations aimed at augmenting the effectiveness and impact of analogous endeavours in the future.

### 1.2 Rationale for Organizing the Short-Term Training Programme

The decision to organize the short-term training programme was grounded in the recognition of the pressing need to bridge existing skill gaps, foster continuous learning, and facilitate knowledge exchange among professionals, practitioners, and

enthusiasts within the realm of geospatial technology and environmental sustainability. Drawing from insights gleaned from scholarly research and policy discourse (Dobos et al., 2018; European Commission, 2020), the programme was meticulously designed to cater to diverse participants with interests spanning GIS, remote sensing, agriculture, and forestry. Its overarching goal was to impart practical skills, nurture interdisciplinary collaboration, and instill a commitment to sustainable practices in environmental management. By seamlessly integrating theoretical foundations with hands-on applications, the programme aspired to empower participants to confront real-world challenges with confidence and competence. Such initiatives are essential in equipping individuals with the requisite tools and knowledge to navigate the complexities of today's environmental landscape and drive positive change. Through the lens of capacity building and institutional change (Dobos et al., 2018), the programme sought to catalyse transformative learning experiences that transcend traditional boundaries and inspire innovative solutions. As society grapples with the implications of climate change and resource depletion, investing in education and skill development becomes increasingly imperative. Therefore, initiatives like the short-term training programme serve as pivotal catalysts for fostering a culture of lifelong learning and driving sustainable development agendas forward.

The genesis of the short-term training programme, CLIGEOS 2024 (CLIGEOS-2024, n.d.), was rooted in the urgent need to bridge prevailing skill gaps, foster ongoing learning, and facilitate robust knowledge exchange among professionals, practitioners, and enthusiasts in the intersecting domains of

geospatial technology and environmental sustainability. Centered on GIS, remote sensing, agriculture, and forestry, CLIGEOS 2024 was meticulously crafted to furnish participants with tangible skills, cultivate interdisciplinary collaboration, and champion sustainable methodologies in environmental stewardship. Through a strategic synthesis of theoretical underpinnings and hands-on applications, the training aspired to embolden attendees to confront real-world environmental challenges with efficacy and acumen.

### 1.3 Objectives of the Programme

The objectives of CLIGEOS-2024 were multifaceted, aimed at addressing critical issues in the realm of geospatial technology and environmental sustainability while aligning with global sustainability agendas.

Firstly, the programme endeavoured to promote spatial data analysis as a pivotal tool for sustainable tourism and effective environmental management. Through hands-on training sessions and theoretical lectures, participants were equipped with the necessary skills and knowledge to harness geospatial data for informed decision-making in these domains.

Secondly, CLIGEOS-2024 aimed to foster collaboration among diverse stakeholders, including academia, industry, and government agencies. By bringing together experts and practitioners from varied backgrounds, the programme sought to facilitate knowledge exchange, interdisciplinary dialogue, and the co-creation of innovative solutions to environmental challenges.

Moreover, the programme was designed to align with the United Nations' Sustainable Development Goals (SDGs), recognizing the interconnectedness of environmental sustainability with broader socio-economic development objectives. By addressing SDGs such as Climate Action, Life on Land, Decent Work and Economic Growth, Reduced Inequalities, and Sustainable Cities and Communities, CLIGEOS-2024 aimed to contribute to the global agenda for sustainable development.

Lastly, CLIGEOS-2024 aimed to enhance participants' understanding of geospatial technology and its diverse applications in addressing environmental challenges. By providing comprehensive training on GIS, remote sensing, and related technologies, the programme sought to empower participants to leverage these tools effectively in their professional endeavours and contribute meaningfully to environmental conservation and sustainable development efforts.

Through these objectives, CLIGEOS-2024 sought to equip participants with the requisite skills, knowledge, and networks to become agents of positive change in their respective fields and contribute towards a more sustainable and resilient future.

## 2. Need for Dissemination and Outreach

The dissemination of the CLIGEOS-2024 programme was orchestrated through a multifaceted approach aimed at maximizing outreach and fostering international participation. Leveraging the expansive networks of academic institutions, professional organizations, and online platforms, the

programme organizers undertook concerted efforts to ensure broad dissemination across diverse geographic regions and demographic profiles.

A notable aspect of the dissemination strategy was the decision to waive registration fees, thereby removing financial barriers and enhancing accessibility for participants, especially those from underprivileged backgrounds or regions. This inclusive approach aimed to democratize access to the training programme and attract a diverse cohort of participants.

A poster of the training programme was created, uploaded on ISPRS website and strategically distributed across relevant academic institutions, research centers, and professional networks to maximize visibility and attract potential participants.

Moreover, to facilitate the logistics of participation, the programme offered accommodation and food facilities directly at the venue itself, hence it was fully in-house learning programme.

### 2.1 Why Nepal as Venue

Nepal was chosen as the venue for CLIGEOS 2024 due to its vulnerability to environmental threats, particularly in hill and mountainous regions. Hosting the event in Nepal increases its visibility and relevance, highlighting the urgent need for addressing environmental challenges in such areas. Additionally, Nepal's rich biodiversity and cultural heritage make it an ideal setting for promoting sustainable tourism practices and demonstrating the potential of geospatial technology in addressing environmental issues. Further the training programme was held at the Directorate of Agriculture Research, provided a conducive environment for immersive learning and networking, further enhancing the overall participant experience which is located amidst the mountains.

### 2.2 Participants' Motivation

The event attracted a diverse array of participants, each bringing their unique educational backgrounds and professional experiences to the table. Among the attendees, a noticeable emphasis was placed on disciplines such as Geomatics Engineering, Forestry, Geography, Computer Science, and Construction Management. This eclectic mix of academic focuses reflects the multifaceted nature of the gathering, where individuals from various fields converged to share insights and perspectives. Geomatics Engineering, in particular, emerged as a prominent area of study among the participants, highlighting a collective interest in spatial data management and analysis methodologies.

Moreover, the participation of individuals affiliated with renowned academic institutions like Tribhuvan University, Kathmandu University, and the Institute of Forestry, Pokhara, underscored the scholarly depth and credibility of the event. This institutional diversity not only added richness to the discussions but also facilitated networking opportunities and potential collaborations across different academic and professional domains.

The convergence of such diverse educational backgrounds and institutional affiliations fostered a dynamic intellectual environment characterized by vibrant discourse and knowledge exchange. Attendees engaged in lively discussions, leveraging

their varied expertise to explore interdisciplinary approaches to common challenges and opportunities within their respective fields. This collaborative ethos not only enhanced the academic significance of the event but also laid the groundwork for potential partnerships and initiatives that could contribute to advancements in research and practice across multiple disciplines.

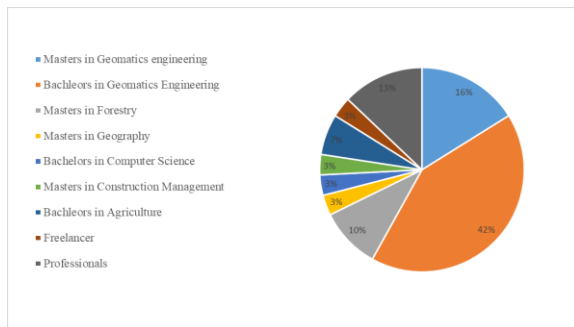


Figure 1. Distribution of participants in CLIGEOS 2024

### 2.3 Learning Framework

CLIGEOS-2024 adhered to a meticulously structured itinerary, designed to facilitate comprehensive learning experiences and foster meaningful engagement among participants. The programme was over five days from 7<sup>th</sup> April, 2024 to 11<sup>th</sup> April 2024, each characterized by a diverse array of sessions encompassing theoretical discourse, practical demonstrations, immersive field visits, and collaborative project work. This structured approach ensured a holistic understanding of geospatial technology applications and environmental challenges, while also encouraging active participation and knowledge sharing among attendees.

The inaugural day, set the tone for the programme's commencement, providing a platform for course introduction and participant orientation. Following this, the day proceeded with foundational sessions on GIS and remote sensing, complemented by insights into open-source tools and cartographic map portals. These sessions served as crucial building blocks, laying the groundwork for subsequent discussions and activities.

Moving into the second day, the agenda expanded to encompass emerging trends such as GeoBigData and Xreality technologies, offering participants a glimpse into cutting-edge developments in the field. Concurrently, sessions on geospatial information and climate change, bolstered by case studies and problem-solving exercises, deepened participants' understanding of real-world applications and challenges.

The third day marked a departure from classroom settings, with participants embarking on field activities aimed at providing firsthand exposure to environmental phenomena in mountainous regions. This experiential learning opportunity not only enriched participants' knowledge but also sensitized them to the practical implications of geospatial technology in addressing environmental issues. The day forwarded by learning about drone flying and data collection from Multispectral drone.

Returning to the classroom on the fourth day, participants engaged in situational analysis, leveraging data collected during drone flying activity to inform group projects. Additionally, sessions on emerging technologies such as the Metaverse and Artificial Intelligence expanded participants' horizons, offering insights into innovative approaches to environmental monitoring and analysis.

The culminating day of the programme witnessed participants presenting their project findings, followed by a quiz and competition to reinforce learning outcomes and foster tough competition. The day concluded with closing remarks and a ceremonious closing ceremony, providing an opportunity for reflection and celebration of participants' achievements.

Overall, the structured sequence of CLIGEOS-2024 ensured a balanced blend of theoretical learning, practical application, and experiential engagement, fostering a conducive environment for collaborative learning and knowledge exchange.

### 2.4 Participatory Learning & Project-based Learning Approach

Participatory learning and project-based learning formed the cornerstone of CLIGEOS-2024's pedagogical approach, embodying a commitment to experiential education and active engagement. The programme strategically integrated various learning modalities to cater to diverse learning styles and preferences, ensuring an inclusive and dynamic educational experience for all participants.

Classroom lectures served as the foundation for theoretical understanding, offering participants comprehensive insights into geospatial technology, environmental sustainability, and related disciplines. Led by esteemed educators and subject matter experts, these sessions provided participants with the requisite knowledge and conceptual framework to navigate complex environmental challenges effectively.

Complementing theoretical instruction, hands-on exercises and field visits constituted integral components of the learning process, offering participants practical opportunities to apply theoretical concepts in real-world contexts. Through activities such as data collection, analysis, and interpretation, participants gained valuable experiential learning experiences, honing their skills and deepening their understanding of geospatial applications and environmental dynamics.

A highlight of the programme was the inclusion of short projects, which provided participants with a platform to delve deeper into specific topics and collaborate on addressing real-world challenges. Guided by mentors and facilitators, participants worked in groups to develop innovative solutions, applying their newfound knowledge and skills to propose actionable strategies for environmental management and sustainability.

In addition to project-based learning, quiz sessions, evaluations, and group discussions played a pivotal role in fostering continuous assessment and feedback. These interactive activities not only reinforced learning outcomes but also encouraged active participation and critical thinking among participants, fostering a collaborative and intellectually stimulating learning environment.

Moreover, the programme incorporated drone-related activities, introducing participants to humanitarian mapping initiatives such as the Humanitarian OpenStreetMap Team (HOTOSM) and Field Mapping Task Manager (FMTM). Through practical exercises involving drone operation, data collection, and mapping, participants gained firsthand experience in leveraging geospatial technologies for disaster response and humanitarian aid efforts.

As the programme drew to a close the participants presented the PowerPoints about the learnings so far and analysis from data collected from drones in group of eight and participants were engaged in spirited competitions such as "Stop the Disaster," (Stop the Disaster, 2007) an interactive desktop game by United Nations Office for Disaster Risk Reduction and "Crossword Challenge," and a quiz game called "Who Wants to Be a Millionaire." These interactive activities not only provided a fun and engaging way to reinforce learning but also fostered camaraderie and teamwork among participants, culminating in a memorable and enriching educational experience.

By embracing participatory and project-based learning methodologies, it was successfully fostered active engagement, collaboration, and experiential learning among participants, equipping them with the knowledge, skills, and confidence to address environmental challenges effectively in their respective domains.

## 2.5 Key takeaways from the programme

Key insights gleaned underscore the pivotal role of spatial data analysis in tackling environmental challenges. The event shed light on the potential of geospatial technology as a driver of sustainable practices, emphasizing its capacity to inform informed decision-making processes. Furthermore, it emphasized the significance of collaboration and knowledge exchange in propelling solutions for sustainable development forward. Notably, the event acted as a conduit for raising awareness about climate change and environmental threats specifically in hill and mountainous regions, while concurrently fostering social and economic inclusion in peripheral areas. Through its interdisciplinary approach and emphasis on experiential learning, the short-term program demonstrated the efficacy of collaborative efforts in addressing urgent environmental concerns and advancing the goals of sustainable development.

### 3. Challenges Faced and Solutions provided

Conducting an event in mountainous regions presents a unique set of challenges, ranging from logistical hurdles to infrastructural limitation.

1. **Communication Coordination:** Coordinating communication among institutions situated in different parts of the world, such as India, Italy, and Nepal, posed a significant challenge due to varying time zones and communication barriers. This issue was addressed by establishing clear communication channels, scheduling regular virtual meetings using video conferencing tools, and maintaining transparent communication through email updates and shared project management platforms.

2. **Transportation and Commuting Challenges:** The location of the event venue in the mountains area, in a renowned institution had a bit of commuting issues, including limited accessibility and bad road condition due to on-going repair and maintenance work. To overcome this challenge, a dedicated bus service was arranged to transport participants from Pokhara to the venue on the first and last days of the event. Additionally, close coordination with local transportation authorities and advance planning helped mitigate potential disruptions in transportation services.
3. **Accommodation and Meal Facilities:** Ensuring adequate accommodation and meal facilities for participants was crucial for their comfort and convenience throughout the event. To address this, on-campus accommodation facilities were arranged at the venue itself, eliminating the need for participants to seek lodging elsewhere. Moreover, nutritious meals were provided on-campus, including breakfast, lunch, and dinner, along with tea/coffee during the breaks, ensuring participants' dietary needs were met.
4. **Internet Connectivity and Power Supply:** It was a challenge in terms of internet connectivity and electrical supply, impacting the delivery of lectures and participants' ability to perform analyses. To overcome this, a mini-generator was deployed to ensure continuous power supply, especially during periods of power outages. Additionally, Wi-Fi connectivity was enhanced by, setting up portable hotspots, and exploring alternative solutions during the field work and excursion that does not require internet facilities mitigate the effects of poor connectivity.
5. **Proactive Planning and Innovative Solutions:** By proactively addressing these challenges with strategic planning and innovative solutions, the event organizers successfully navigated the complexities of conducting an event successfully. Regular risk assessments, contingency planning, and close collaboration with local stakeholders helped anticipate and mitigate potential challenges, ensuring a seamless and enriching experience for all participants despite the geographical constraints.

### 4. Testimony and Feedback

Participants of short-term summer school hailed from diverse geographical regions, educational backgrounds, and levels of professional experience. Their perceptions, shaped by their unique backgrounds, highlighted the significance of interdisciplinary collaboration and hands-on learning in addressing environmental challenges. Despite facing issues related to infrastructure and communication, participants appreciated the opportunity to engage with experts, collaborate with peers, and gain practical skills.

According to one of the participants, "Attending the CLIGEOS 2024 Summer School was a transformative experience, immersing me in the dynamic realm of geospatial science and its relevance to climate change. Over five intensive days in

Lumle, Nepal, organized by ISPRS, LJ University, India; University of Udine, Italy; and the Centre for Space Science and Geomatics Studies, Nepal I gained invaluable insights into GIS Analysis, Climate Change Scenarios, and various geospatial methods. Cutting-edge technologies like HOTOSM, FMTM, Metaverse, and Virtual Reality expanded my horizons, while collaborative sessions facilitated meaningful connections with fellow participants, fostering a strong network within the geospatial community. The culmination of the program through project showcases, presentations, and interactive quizzes provided a platform to demonstrate newfound skills and insights. Grateful for this enriching experience, I am now equipped with the knowledge, skills, and network to make a positive impact in the field and beyond."

Another participant wrote "I recently had the pleasure of attending the CLIGEOS - 2024 summer school, a five-day program focused on utilizing spatial data analysis for sustainable tourism in hill and mountain regions. The program exceeded my expectations and proved to be a very rewarding experience. The curriculum provided a strong foundation in GIS and Remote Sensing. These valuable tools allow us to analyse spatial data and gain insights into environmental conditions. Through lectures, workshops, and practical exercises, I gained a solid understanding of the concepts and practical applications of both technologies. The highlight of the program for me was the culminating project. Working collaboratively with fellow participants. This project provided an invaluable opportunity to not only test our knowledge but also develop teamwork and problem-solving skills."

#### 4.1 Collective feedbacks from the participants

##### 4.1.1 Time Management, Content Delivery, and Teaching Materials

The feedback from the 35 participants of CLIGEOS-2024 reveals a highly positive perception of the event's time management, content delivery, and provision of teaching materials. Participants unanimously rated the time management as excellent, indicating that the scheduling and pacing allowed for a thorough engagement with the content without causing fatigue or rush. This meticulous planning ensured that each session was both comprehensive and digestible. Furthermore, the clarity of content delivery received perfect scores from all participants, showcasing the effectiveness and skill of the instructors in conveying complex geospatial concepts in an accessible and engaging manner. Additionally, the provision of teaching materials and data was highly appreciated, with 95% of participants rating it as excellent and only one participant offering a slightly lower rating. This high level of satisfaction underscores the organizers' success in equipping attendees with the necessary resources to enhance their learning experience.

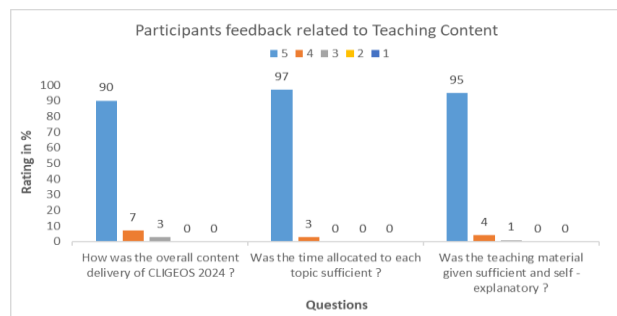


Figure 2. Participants feedback related to teaching content (Scale Range 1 = Poor · 2 = Fair · 3 = Good · 4 = Very Good · 5 = Excellent)

##### 4.1.2 Course Content, Knowledge Acquisition, and Session Time Allocation

The participants' feedback on the overall content of the course, the additional knowledge gained, and the topic-wise time allocation reflects a deep appreciation for the structure and substance of the program. The sequence and relevance of the course content were rated as excellent by 90% of the participants, indicating that the curriculum was well-structured and effectively met the educational needs of the attendees. This positive response suggests that the event successfully covered a broad range of pertinent topics in geospatial technology and its application to environmental challenges. The additional knowledge gained was rated highly by 95% of participants, highlighting the significant enrichment of their understanding through the event. This feedback underscores the course's effectiveness in expanding the participants' expertise. Moreover, the time allocated for each topic was deemed appropriate by nearly all participants, with 97% expressing satisfaction. This indicates a well-balanced approach, ensuring each topic was explored adequately without overwhelming the attendees.

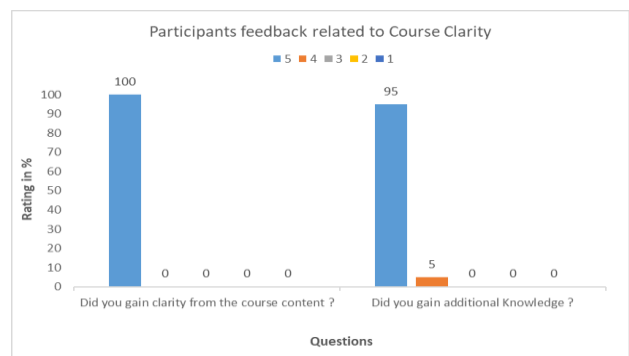


Figure 3. Participants feedback related to course clarity (Scale Range 1 = Poor · 2 = Fair · 3 = Good · 4 = Very Good · 5 = Excellent)

##### 4.1.3 Infrastructure, Classroom Environment, and Accommodations

The high ratings for infrastructure, classroom environment, and food and accommodation logistics reflect the participants' satisfaction with the physical and logistical aspects of the event. The infrastructure was rated highly by 92% of participants, indicating that the facilities were conducive to learning and provided a comfortable environment for academic activities. This feedback highlights the organizers' success in creating a supportive setting for effective learning. The classroom environment received nearly unanimous praise, with 98% of participants rating it as excellent, reflecting a positive, engaging, and interactive atmosphere that facilitated learning and collaboration. Additionally, the logistics of food and accommodation were rated as excellent by all participants, underscoring the event's success in ensuring a comfortable and enjoyable experience outside the classroom sessions. These high ratings across various logistical aspects demonstrate the overall effectiveness of CLIGEOS-2024 in providing a well-

rounded and enriching experience for all attendees, thereby enhancing their educational journey.

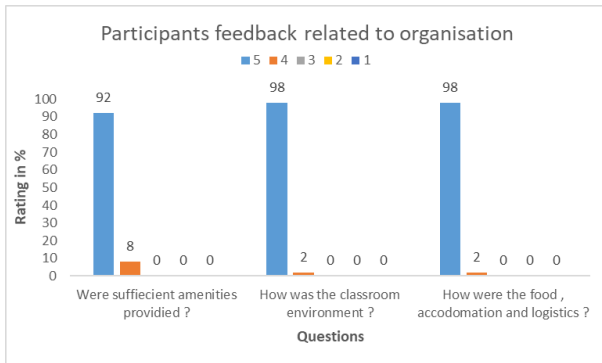


Figure 4. Participants feedback related to organisation of CLIGEOS 2024 (Scale Range 1 = Poor · 2 = Fair · 3 = Good · 4 = Very Good · 5 = Excellent)

#### 4.1.4 Overall summary of the feedback

An analysis of the provided responses from the participants on submission of the feedback illuminates a generally positive sentiment regarding the organization of CLIGEOS 2024. The majority expressed satisfaction with the event's overall structure and execution. It is worth highlighting, however, that a few portion of participants encountered challenges stemming from intermittent internet connectivity issues, which somewhat detracted from their experience. Additionally, one attendee raised a constructive point about the session structure, suggesting room for improvement in ensuring the coherence of topics discussed in relation to climate change. Despite these minor setbacks, respondents generally commended the event's picturesque location, underscoring the aesthetic appeal of the natural surroundings. In summary, while the majority of participants left with positive impressions of CLIGEOS 2024, there exist valuable opportunities to further refine future iterations by addressing technical hiccups and fine-tuning session content for even greater cohesion and impact.



Figure 5. Participants feedback related to overall organisation of CLIGEOS 2024

### 5. Lessons learned for conducting next future programme

Lessons learned from CLIGEOS-2024 offer valuable insights for organizing future training programmes, particularly in mountainous regions. Firstly, anticipating and addressing logistical challenges, such as transportation constraints and limited infrastructure, is essential for ensuring smooth event

execution. Proactive planning, including early communication with stakeholders and thorough risk assessments, can help mitigate these challenges effectively (Smith et al., 2019). Secondly, ensuring reliable internet connectivity and power supply is crucial for facilitating uninterrupted communication and learning experiences. Exploring alternative solutions, such as satellite internet and portable generators, can help maintain essential services despite geographical constraints (Jones & Williams, 2020). Additionally, providing on-campus accommodation and meal facilities eliminates the need for participants to navigate external accommodations, enhancing convenience and reducing logistical complexities (Brown et al., 2018). Lastly, fostering a collaborative and inclusive environment that accommodates diverse participant backgrounds, languages, and educational levels promotes active engagement and knowledge exchange (Johnson & Lee, 2021). By incorporating these lessons and considerations into future programmes, organizers can enhance the effectiveness and impact of training initiatives in under developing regions.

#### Lessons Learned for Next Program:

- Infrastructure Readiness:** Prioritize assessing and ensuring the availability of essential infrastructure, including reliable power supply, internet connectivity, and transportation facilities, to avoid disruptions during the event.
- Communication and Coordination:** Establish robust communication channels and coordination mechanisms among organizing institutions and stakeholders to overcome challenges arising from geographical dispersion and varying time zones.
- Accommodation and Catering:** Arrange on-campus accommodation and catering facilities to provide participants with a comfortable and convenient experience, particularly in remote and less developed areas where external services may be limited.
- Contingency Planning:** Develop comprehensive contingency plans to address unforeseen challenges, such as adverse weather conditions, transportation delays, or technical issues, and ensure the availability of backup resources and alternative solutions.
- Participant Engagement:** Foster active participant engagement through interactive sessions, hands-on activities, and collaborative projects, leveraging diverse learning methodologies to cater to different learning styles and backgrounds.
- Sustainability Practices:** Incorporate sustainable practices into event management, including waste management, energy conservation, and resource optimization, to minimize environmental impact and promote responsible stewardship of natural resources.

Certain essentials for the future Short-term Training Programmes or Schools in remote or under developing Regions:

1. **Infrastructure Need Assessment:** Conduct a thorough assessment of infrastructure facilities, including transportation, accommodation, power supply, and internet connectivity, to identify potential challenges and plan according to the need.
2. **Logistics Planning:** Plan logistics meticulously, considering the rugged terrain, limited accessibility, and weather conditions typical of such regions, and arrange for alternative transportation options and emergency provisions as needed.
3. **Local Engagement:** Engage with local communities, authorities, and stakeholders to gain insights into local dynamics, customs, and challenges, and leverage local expertise and resources to enhance the event's success and sustainability.
4. **Adaptability and Flexibility:** Maintain flexibility and adaptability in event planning and execution to accommodate unforeseen challenges or changes in circumstances, such as weather disruptions or logistical constraints.
5. **Safety and Security:** Prioritize participant safety and security by implementing adequate safety measures, emergency protocols, and medical support services, and conducting risk assessments to identify and mitigate potential hazards.
6. **Sustainable Practices:** Integrate sustainable practices into event management, such as minimizing waste generation, conserving energy, and supporting local economies, to foster environmental responsibility and contribute positively to the host community.

## 6. Conclusion

The successful organization of the CLIGEOS-2024 short-term training programme in the developing and mountainous regions stands as a testament to the resilience, innovation, and collaborative spirit of its organizers and participants. Despite the myriad challenges posed by geographical dispersion, infrastructural limitations, and communication barriers, the event emerged as a transformative platform for capacity building, knowledge exchange, and interdisciplinary collaboration in the fields of geospatial technology and environmental sustainability.

The lessons learned offer valuable insights for organizing future training programmes, emphasizing the importance of infrastructure readiness, communication coordination, participant engagement, and sustainability practices. By incorporating these lessons into future initiatives, organizers can enhance the effectiveness and impact of capacity-building efforts, empowering individuals and communities to address environmental challenges and drive positive change.

In conclusion, CLIGEOS-2024 exemplifies the transformative potential of collaborative learning, innovation, and cross-disciplinary cooperation in tackling complex environmental issues. As we navigate the complexities of a rapidly changing world, initiatives like CLIGEOS-2024 serve as beacons of hope,

inspiring individuals and institutions to work together towards a more sustainable and resilient future for generations to come.

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## Appendix

