



Gandaki Provincial Policy and Planning Commission
Gandaki Province Government
Pokhara, Nepal

Climate Atlas of Gandaki Province

*Long-Term Monthly, Seasonal, Annual, and Decadal Temperature and
Precipitation Patterns of Gandaki Province*

गण्डकी प्रदेशको जलवायु मानचित्र

गण्डकी प्रदेशको दीर्घकालीन मासिक, ऋतुगत, वार्षिक तथा दशकिय जलवायु प्रवृत्ति



Central Department of Hydrology and Meteorology
Tribhuvan University
Kirtipur, Kathmandu, Nepal

Climate Atlas of Gandaki Province

गण्डकी प्रदेशको जलवायु मानचित्र



**Gandaki Provincial Policy and Planning Commission, Gandaki Province Government,
Pokhara, Nepal**

July 2025

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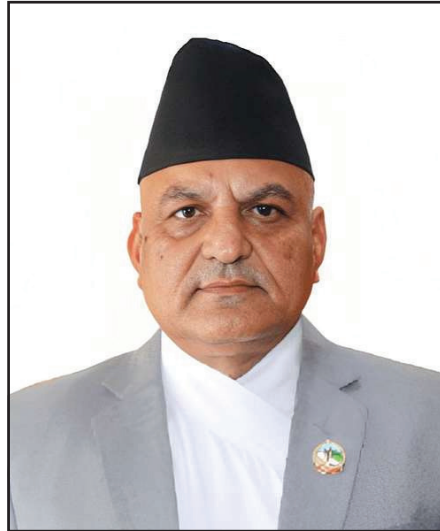
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Gandaki Provincial Policy and Planning Commission
Gandaki Province Government
Pokhara, Nepal



Message

Climate change stands as one of the most pressing challenges facing our province, our nation, and the global community. Gandaki Province's remarkable geographic diversity, from the lowland Terai plains to the towering Himalayan peaks, makes it particularly vulnerable to the complex and far-reaching impacts of a changing climate. These shifts pose significant threats to public health, livelihoods, ecosystems, and the natural resources that underpin our economy and cultural heritage.

In response to these growing risks, Gandaki Province has taken a bold and pioneering step by commissioning the *Climate Atlas of Gandaki Province* (“गण्डकी प्रदेशको जलवायु मानचित्र”), the first such initiative undertaken by any provincial government in Nepal. This atlas marks a major milestone in advancing localized understanding of climate risks and informing efforts to build resilience across all sectors of society.

This scientifically rigorous, data-driven resource presents long-term, spatially detailed analyses of temperature and precipitation trends, alongside patterns of extreme weather events, across the province's varied landscapes. It is intended to guide evidence-based decision-making and strategic planning in key areas such as climate adaptation, disaster risk reduction, and sustainable development, supporting efforts by government bodies, researchers, civil society organizations, and local communities.

The creation of this atlas reflects the strength of collaboration between the Gandaki Province Policy and Planning Commission and academic institutions. Moving forward, sustained investment in climate monitoring, high-resolution data collection, and inter-sectoral coordination will be critical to deepening our understanding and strengthening resilience.

I extend my heartfelt thanks to all those who contributed to this important work. I urge stakeholders at all levels to actively use this atlas as a foundation for informed, climate-resilient action and as a catalyst for ongoing collaboration to ensure a secure and sustainable future for Gandaki Province.

Honorable Surendra Raj Pandey

Chief Minister, Gandaki Province

Chairman, Gandaki Province Policy and Planning Commission



Gandaki Provincial Policy and Planning Commission
Gandaki Province Government
Pokhara, Nepal



Foreword

Climate change presents one of the most urgent challenges of our time, with far-reaching impacts on both the environment and socio-economic sectors worldwide. Nepal, as a highly vulnerable Himalayan country, faces significant risks that threaten livelihoods, agriculture, water resources, and disaster management capabilities.

The *Climate Atlas of Gandaki Province* (“गण्डकी प्रदेशको जलवायु मानचित्र”) provides a spatially explicit, long-term analysis of monthly, seasonal, annual, and decadal temperature and precipitation patterns from 1981 to 2024. Drawing data from a quality-controlled network of meteorological stations and using rigorous scientific methods, the atlas captures the province’s complex climate variability, from the lowland Terai to the high Himalayas. The inclusion of standardized extreme precipitation indices further enhances its capacity to comprehensively assess climate extremes.

This resource serves policymakers, planners, and researchers by providing critical insights into the evolving climate of Gandaki Province. It reveals a consistent warming trend across all elevations and highlights significant spatial variability, along with increasing extremes in precipitation. These changes, manifesting as more frequent intense rainfall and prolonged dry periods, elevate the risks of floods, droughts, and landslides, underscoring the urgent need for climate-sensitive planning in agriculture, water management, urban development, and disaster risk reduction. I sincerely hope this atlas becomes an indispensable reference for the province. Continued updates, expanded climate monitoring, particularly in high mountain regions, and strengthened collaboration among government, academia, and local communities will be essential to building long-term climate resilience.

I extend my heartfelt thanks to the staff of the Policy and Planning Commission and the experts from the Central Department of Hydrology and Meteorology for their dedicated work in producing this invaluable atlas. I encourage its broad use for the sustainable development of Gandaki Province.

Dr. Krishna Chandra Devkota

Vice Chairman, Gandaki Province Policy and Planning Commission



Central Department of Hydrology and Meteorology
Tribhuvan University
Kirtipur, Kathmandu, Nepal

Preface

It is with great pride and a deep sense of responsibility that we present the *Climate Atlas of Gandaki Province* (“गण्डकी प्रदेशको जलवायु मानचित्र”), a landmark achievement and the first initiative of its kind produced by a provincial government in Nepal. This pioneering work, commissioned by the Gandaki Provincial Policy and Planning Commission and led by the Central Department of Hydrology and Meteorology at Tribhuvan University, represents a vital advancement in regional climate science and an important step toward addressing critical knowledge gaps in climate understanding.

Gandaki Province’s extraordinary geographic and climatic diversity, from the subtropical Terai plains to some of the world’s highest Himalayan peaks, presents considerable challenges for climate observation and analysis. Until now, there has been no comprehensive, spatially detailed record of long-term climate patterns across this complex terrain, limiting the capacity for evidence-based adaptation and risk mitigation planning.

In response, this atlas compiles and analyzes 44 years (1981–2024) of high-quality, homogenized meteorological data sourced from an extensive network of climate stations across the province.

Using rigorous quality control and standard homogenization techniques, alongside internationally recognized indices such as the ETCCDI suite of extreme precipitation metrics, it offers a robust, spatially explicit assessment of temperature and precipitation variability and trends.

Key findings reveal a consistent warming trend across all elevations and significant shifts in precipitation patterns, including rising frequency and intensity of extremes such as heavy rainfall and droughts. These developments amplify the risks of floods, droughts, landslides, and other climate-induced hazards, reinforcing the urgency for integrated, cross-sectoral climate resilience strategies.

More than a scientific document, this atlas is a critical decision-support tool designed to inform policymakers, planners, researchers, and local communities. It lays the foundation for climate-informed strategies in agriculture, water resource management, urban planning, and disaster risk reduction, sectors that are vital to sustainable development and societal resilience.

Looking ahead, continuous updates to this dataset, expansion of climate monitoring networks, especially in high-altitude areas, and strengthened collaboration among academia, government, and communities will be essential for meeting the challenges posed by a changing climate. We extend our sincere gratitude to the dedicated experts, institutional partners, and supporters who made this milestone possible. It is our hope that this atlas serves as both a cornerstone for climate action in Gandaki Province and a model for similar efforts across Nepal.

Central Department of Hydrology and Meteorology

Tribhuvan University, Kirtipur, Kathmandu, Nepal

Assoc. Prof. Dr. Binod Dawadi, Principal Investigator (PI)

Acknowledgements

This Climate Atlas of Gandaki Province (“गण्डकी प्रदेशको जलवायु मानचित्र”) was prepared by the Central Department of Hydrology and Meteorology, Tribhuvan University, under the project “Preparation of Climatic Atlas of Gandaki Province, Nepal” (2.7.7.61), which was commissioned and funded by the Gandaki Provincial Policy and Planning Commission, Government of Gandaki Province, Pokhara. We gratefully acknowledge the Commission for its generous financial support and strong institutional collaboration throughout the project. We also extend our sincere thanks to the Government of Nepal, Ministry of Energy, Water Resources and Irrigation, and the Department of Hydrology and Meteorology (DHM) for providing access to the essential meteorological datasets that underpinned the development of this atlas.

We are especially grateful to the Gandaki Provincial Policy and Planning Commission for their guidance and the valuable contributions of their officials and staff, whose administrative coordination and facilitative support were instrumental in the successful execution of the project. We sincerely thank the Vice Chairman Dr. Krishna Chandra Devkota and members Dr. Yogendra Raj Rijal, Mrs. Durga Lamichhane of the commission. Similarly thanks goes to Mr. Tanka Prasad Pandey member secretary of the commission and Santosh Devkota and all the staffs for their valuable insights, consistent support, and commitment to strengthening climate knowledge in the province. We also thank the department head, Prof. Dr. Tek Bahadur Chhetri, along with the dedicated faculty members and staffs of the Central Department of Hydrology and Meteorology, Tribhuvan University, for their continued support, technical input, and encouragement.

Special appreciation goes to the locally elected representatives, traditional leaders, and residents of Barha Gaun Mukti Chhetra, Gharapjhong, Lomanthang, and Lo-Ghekar Damodarkunda Rural Municipalities in Mustang District, whose cooperation, local insights, and warm hospitality during field visits greatly enriched our understanding of community-level experiences and perceptions of climate extremes in high mountain environments.

Finally, we express our heartfelt gratitude to the entire project team. Their dedication, technical expertise, and collaborative spirit across data analysis, cartography, writing, fieldwork, and design were crucial to the successful completion of this atlas, and reflect a shared commitment to advancing climate understanding in the region.

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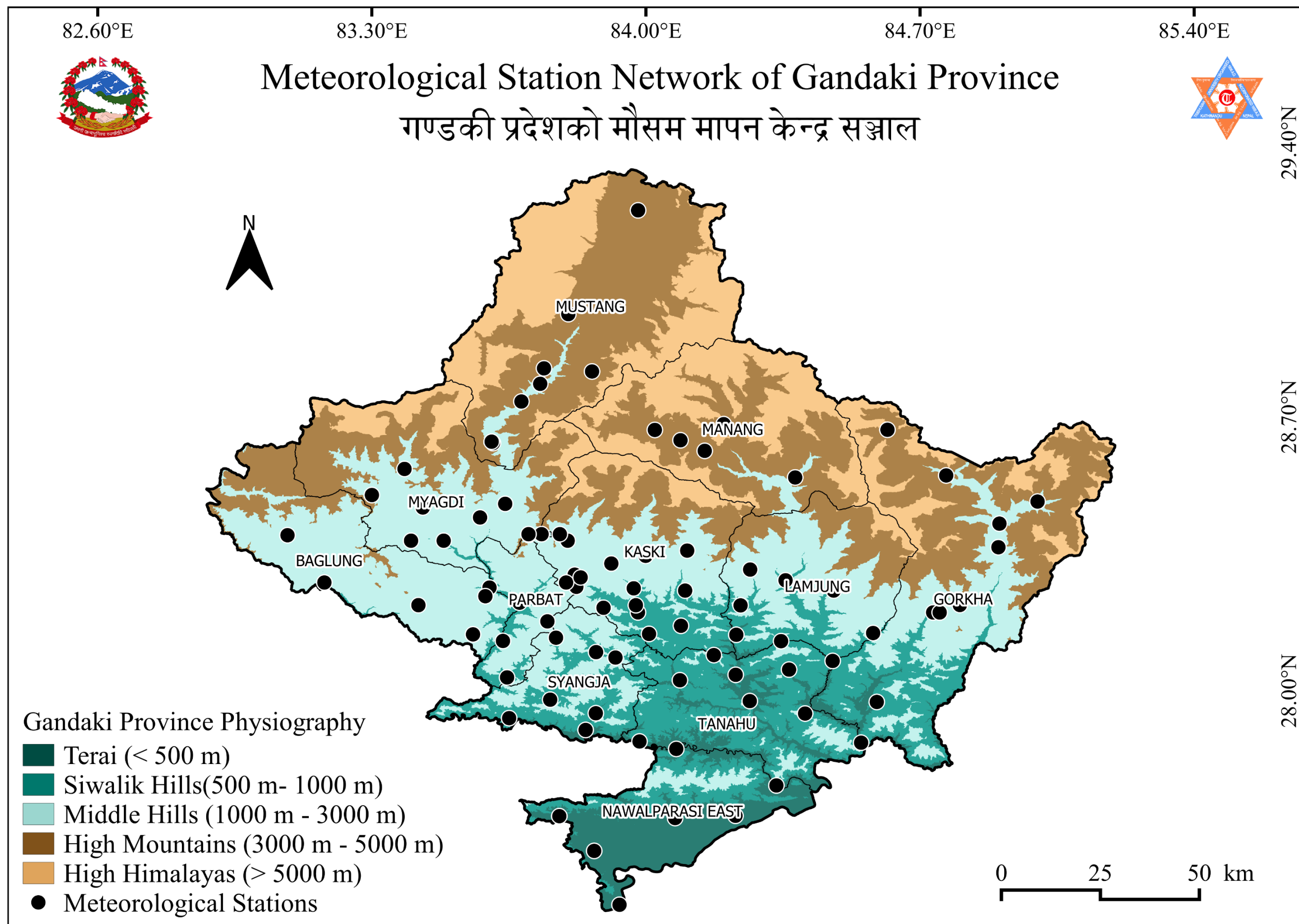
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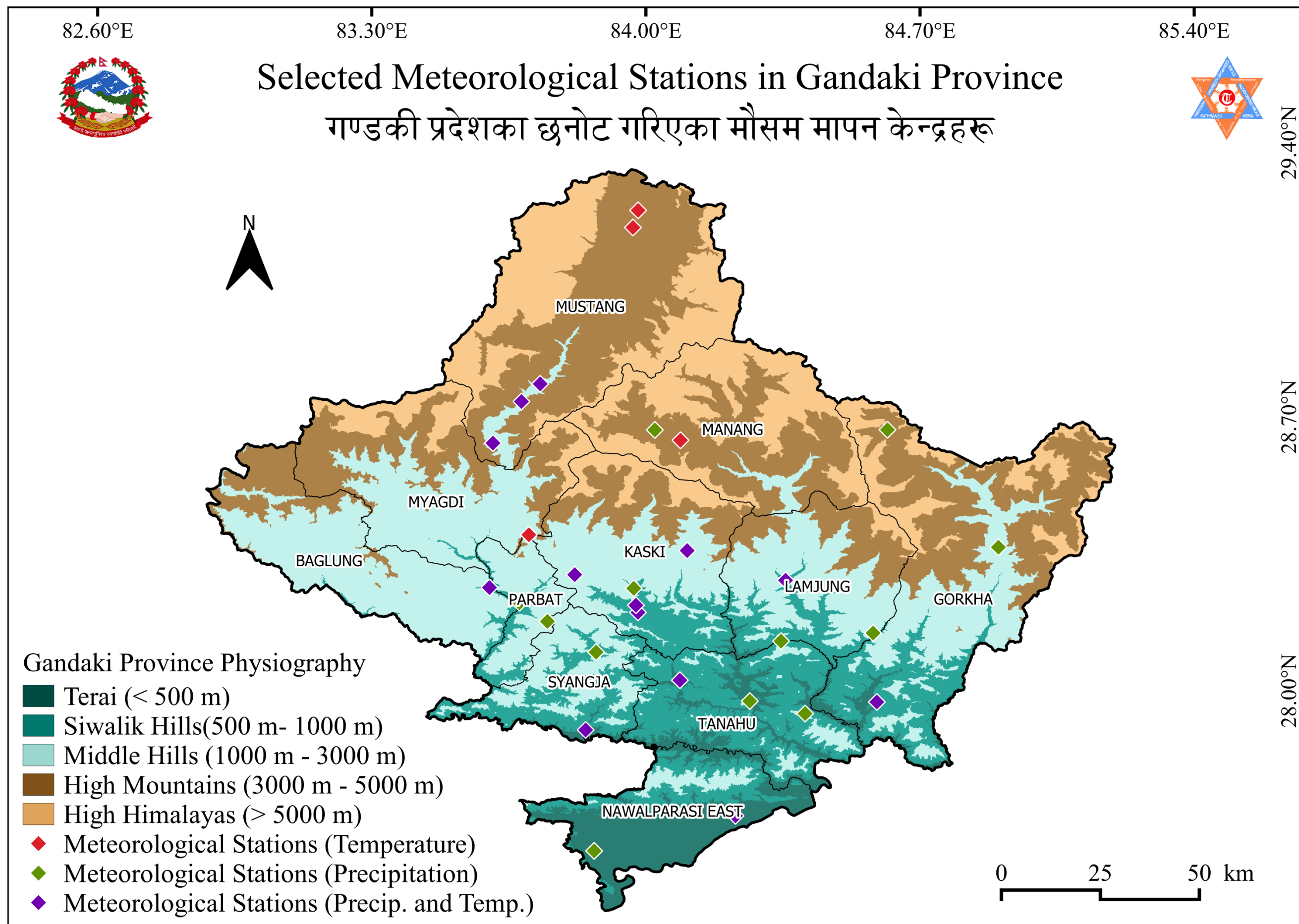
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Section - 1

Meteorological Stations

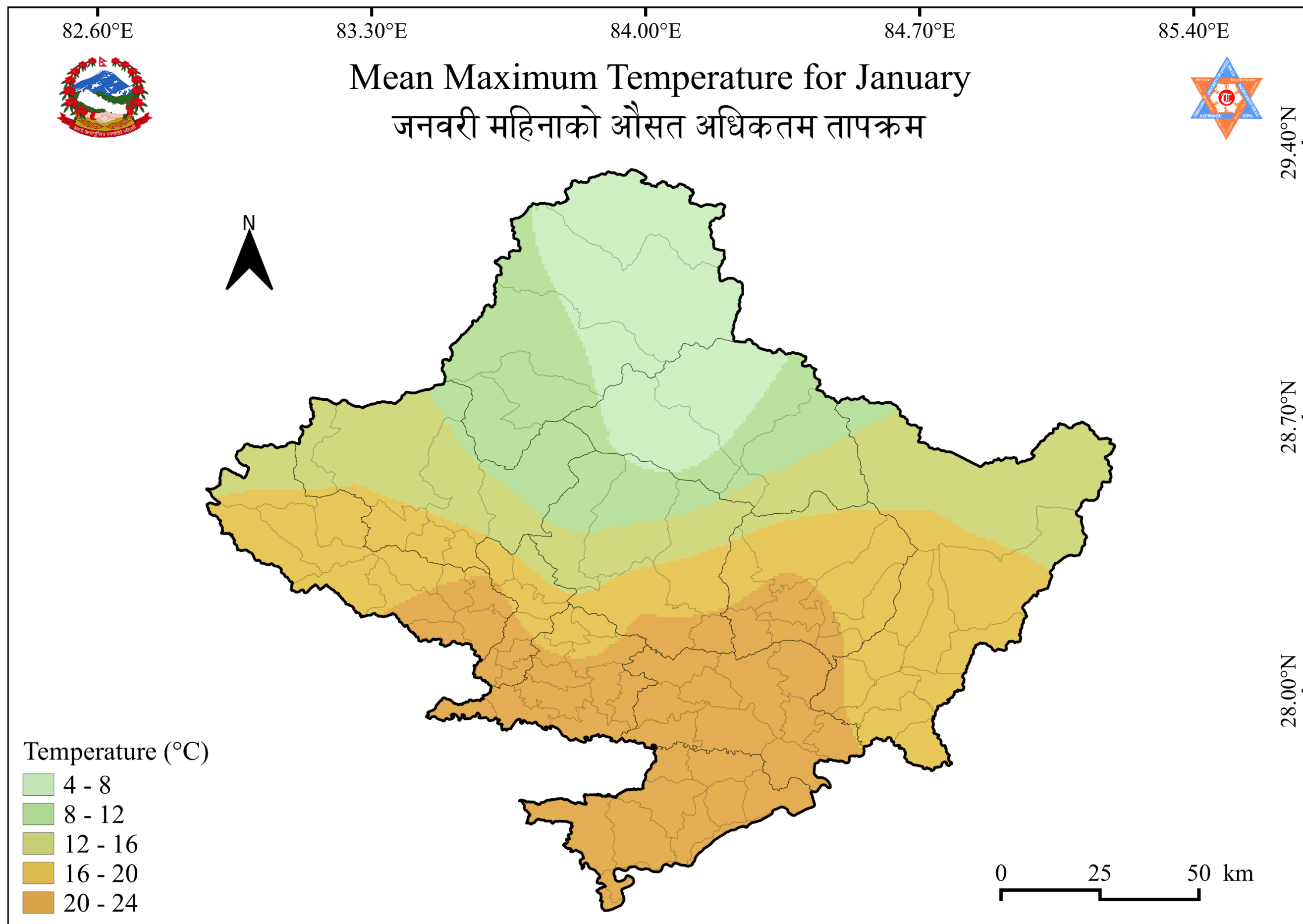


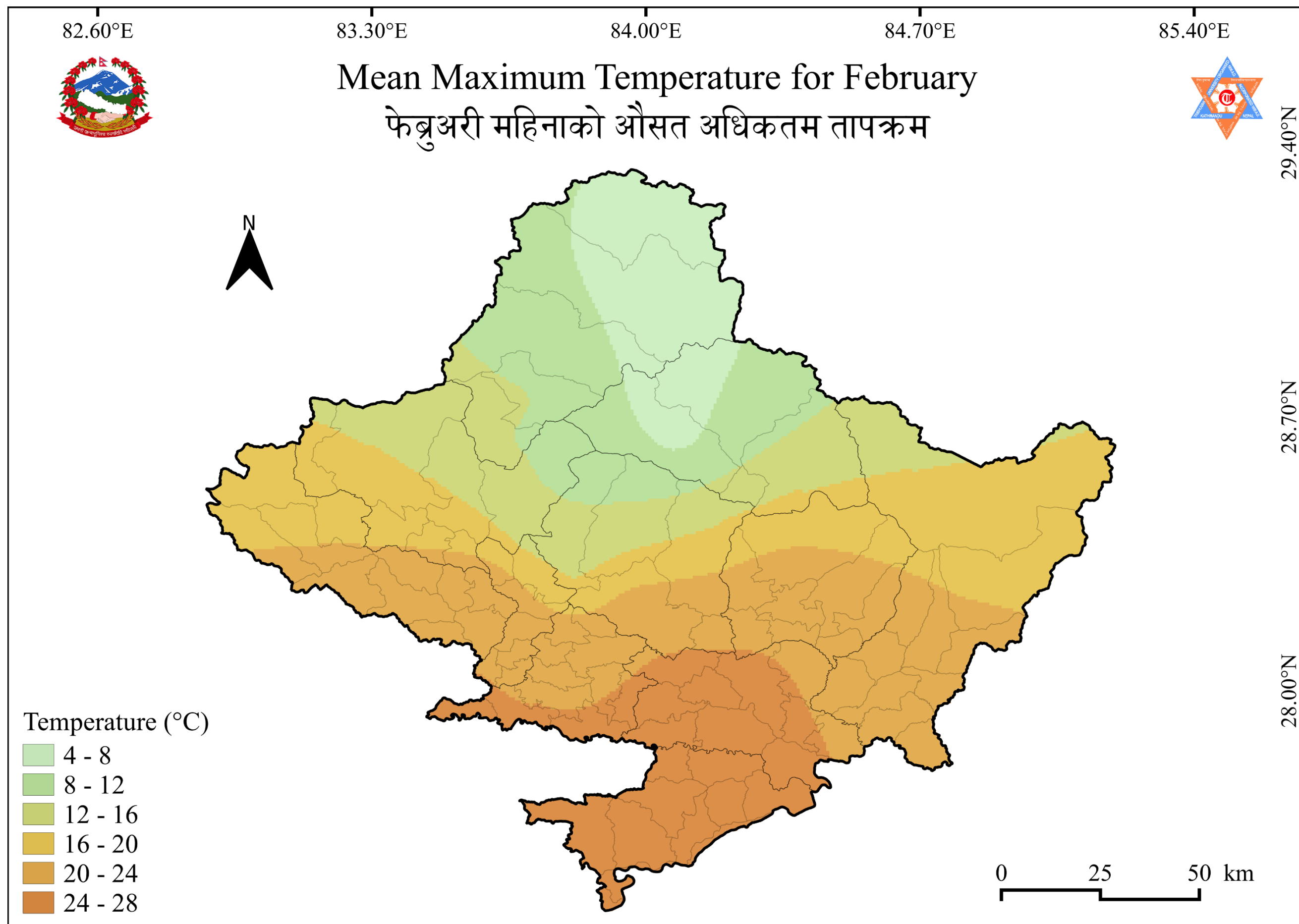


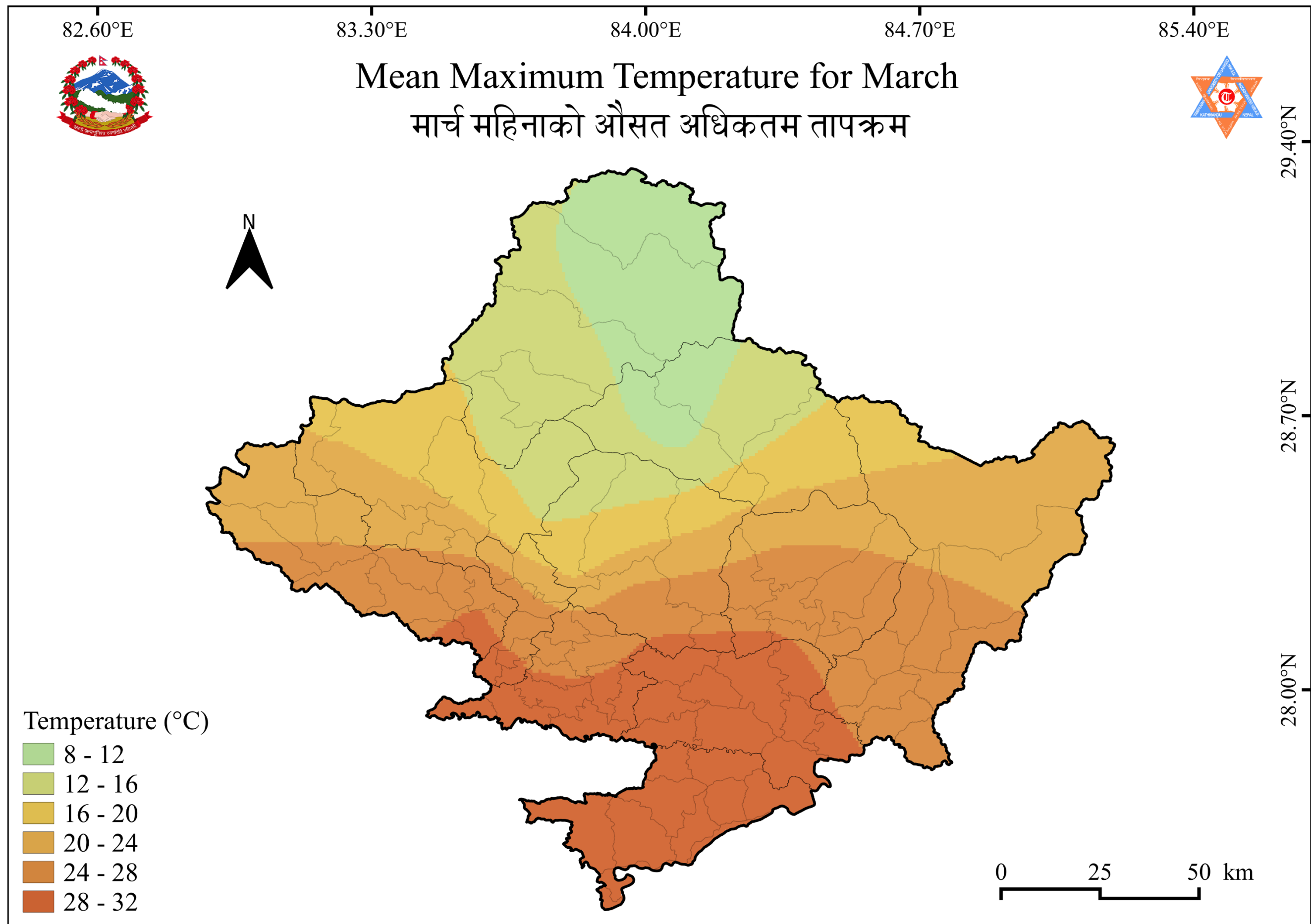
List of Selected Meteorological Stations in Gandaki Province							
Index No.	Station Name	District	Longitude	Latitude	Elevation	Type	Parameters Used
601	Jomsom	Mustang	83.73	28.78	2741	Aero-Synoptic	Precipitation and Temperature
604	Thakmarpha	Mustang	83.68	28.74	2655	Agrometeorology	Precipitation and Temperature
605	Baglung	Baglung	83.60	28.26	964	Climatology	Precipitation and Temperature
607	Lete	Mustang	83.61	28.63	2490	Climatology	Precipitation and Temperature
612	Mustang (Lomangthang)	Mustang	83.97	29.18	3705	Climatology	Temperature
613	Karki Neta	Parbat	83.75	28.18	1642	Precipitation	Precipitation
614	Kushma	Parbat	83.68	28.22	900	Climatology	Precipitation
616	Gurja Khani	Myagdi	83.70	28.40	2872	Climatology	Temperature
633	Chhoser	Mustang	83.98	29.23	3886	Climatology	Temperature
706	Dumkauli	Nawalparasi	84.23	27.68	183	Climatology	Precipitation and Temperature
710	Dumkibas	Nawalparasi	83.87	27.59	167	Precipitation	Precipitation
801	Jagat (Setibas)	Gorkha	84.90	28.37	1334	Precipitation	Precipitation
802	Khudi Bazar	Lamjung	84.36	28.28	838	Climatology	Precipitation and Temperature
804	Pokhara Airport	Kaski	83.98	28.20	827	Aero-Synoptic	Precipitation and Temperature
805	Syangja	Syangja	83.87	28.10	871	Climatology	Precipitation
806	Larke Samdo	Gorkha	84.62	28.67	3650	Precipitation	Precipitation
807	Kunchha	Lamjung	84.34	28.13	820	Precipitation	Precipitation
808	Bandipur	Tanahun	84.41	27.94	991	Climatology	Precipitation
809	Gorkha	Gorkha	84.59	27.97	724	Agrometeorology	Precipitation and Temperature
810	Chapkot	Syangja	83.85	27.90	617	Climatology	Precipitation and Temperature
811	Malepatan (Pokhara)	Kaski	83.97	28.22	859	Agrometeorology	Precipitation and Temperature
814	Lumle	Kaski	83.82	28.30	1738	Agrometeorology	Precipitation and Temperature
815	Khairini Tar	Tanahun	84.09	28.03	515	Climatology	Precipitation and Temperature
817	Damauli	Tanahun	84.27	27.97	347	Climatology	Precipitation
818	Lamachaur	Kaski	83.97	28.26	992	Precipitation	Precipitation
820	Manang Bhot	Manang	84.02	28.67	3556	Precipitation	Precipitation
823	Gharedhunga	Lamjung	84.58	28.15	1088	Precipitation	Precipitation
824	Siklesh	Kaski	84.11	28.36	1996	Precipitation	Precipitation and Temperature
871	Humde Airport	Manang	84.09	28.64	3401	Climatology	Temperature

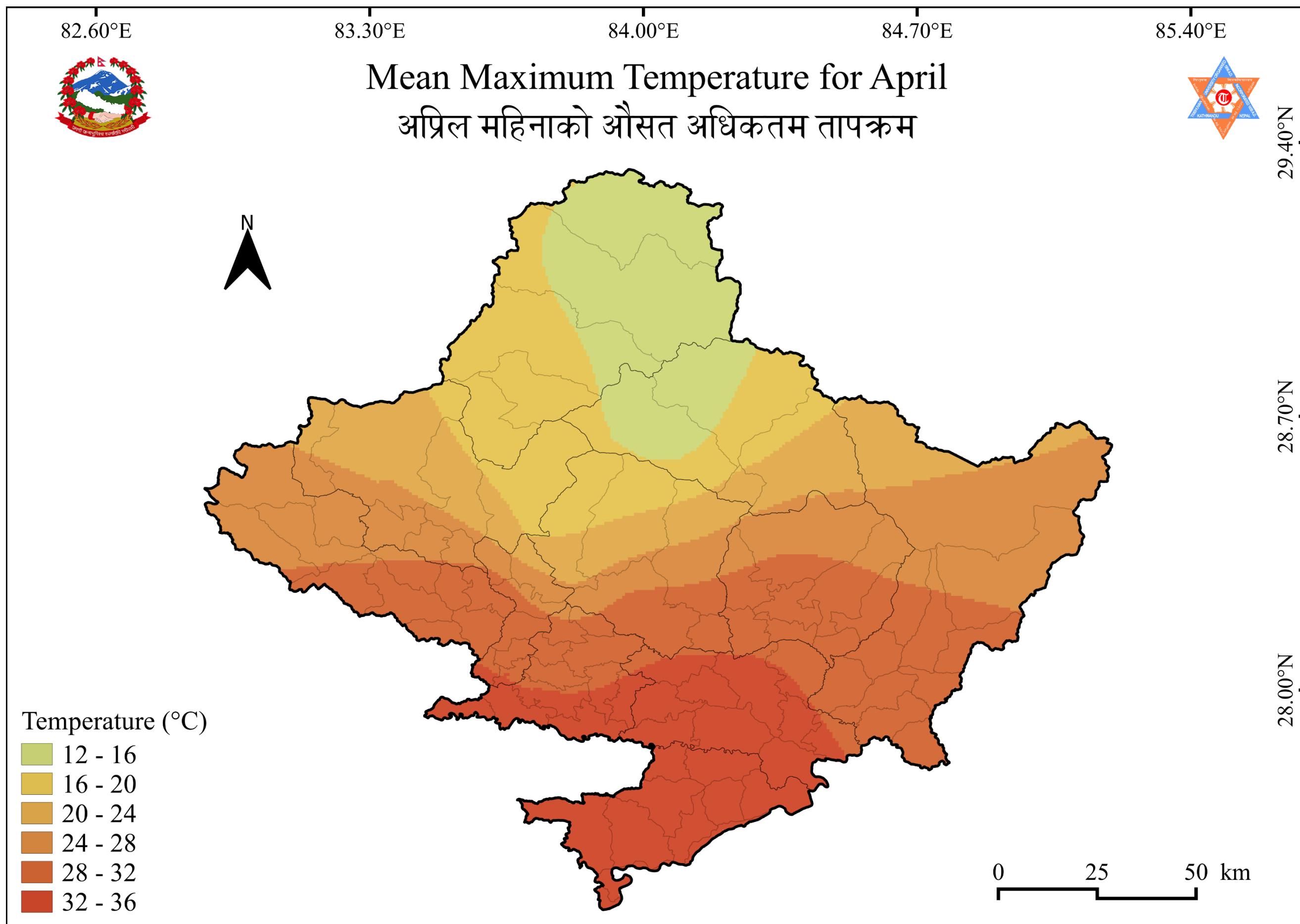
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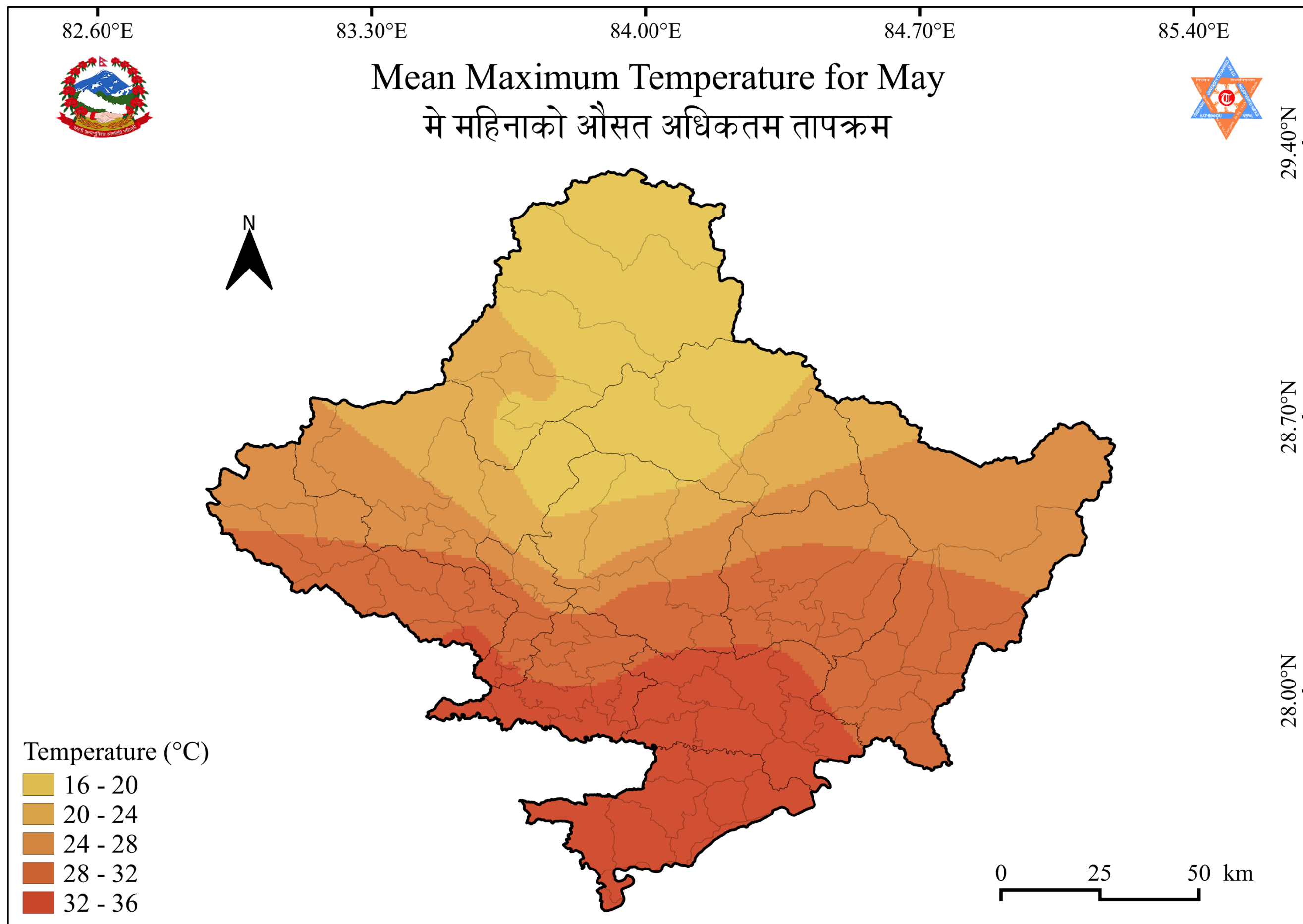
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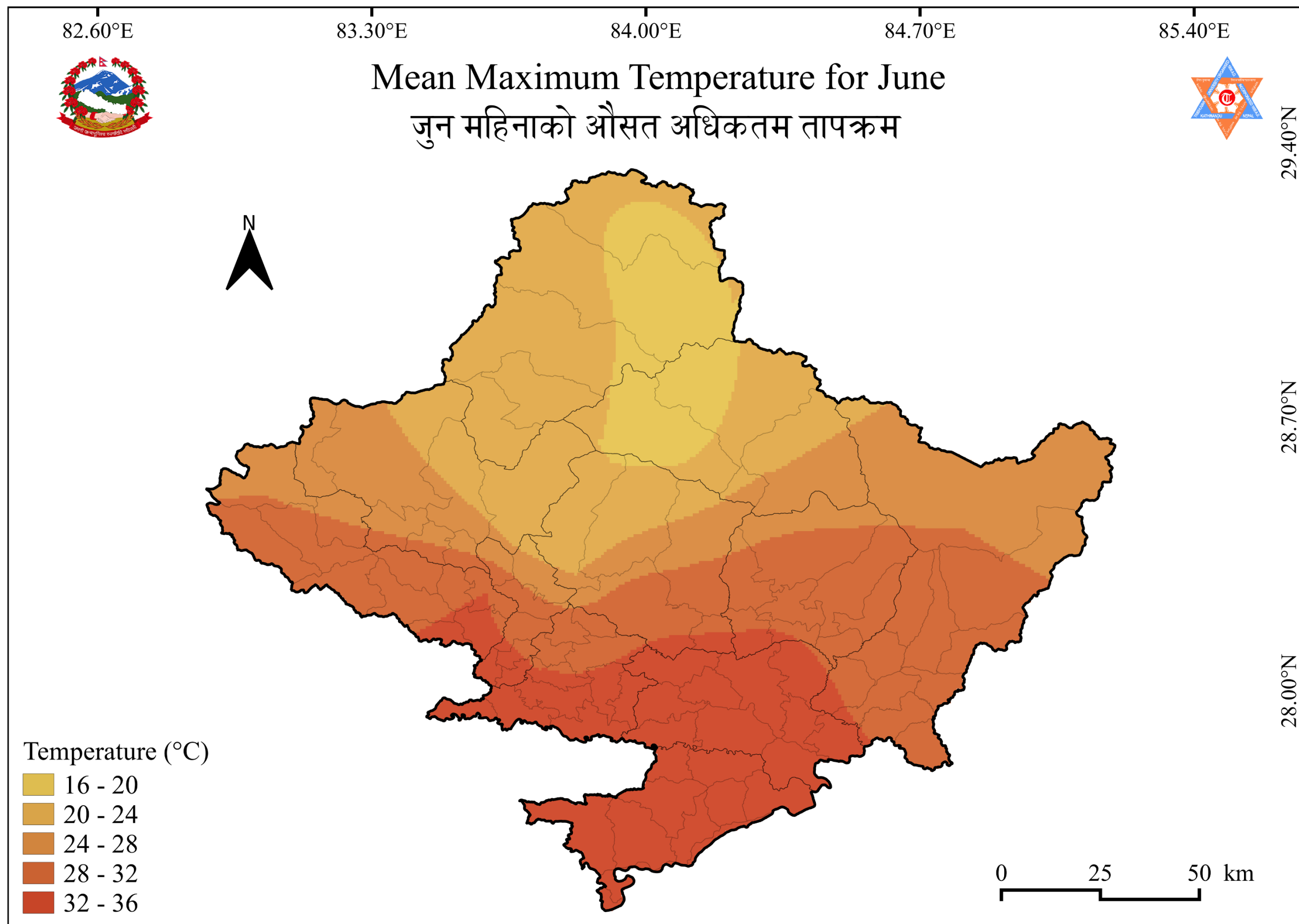


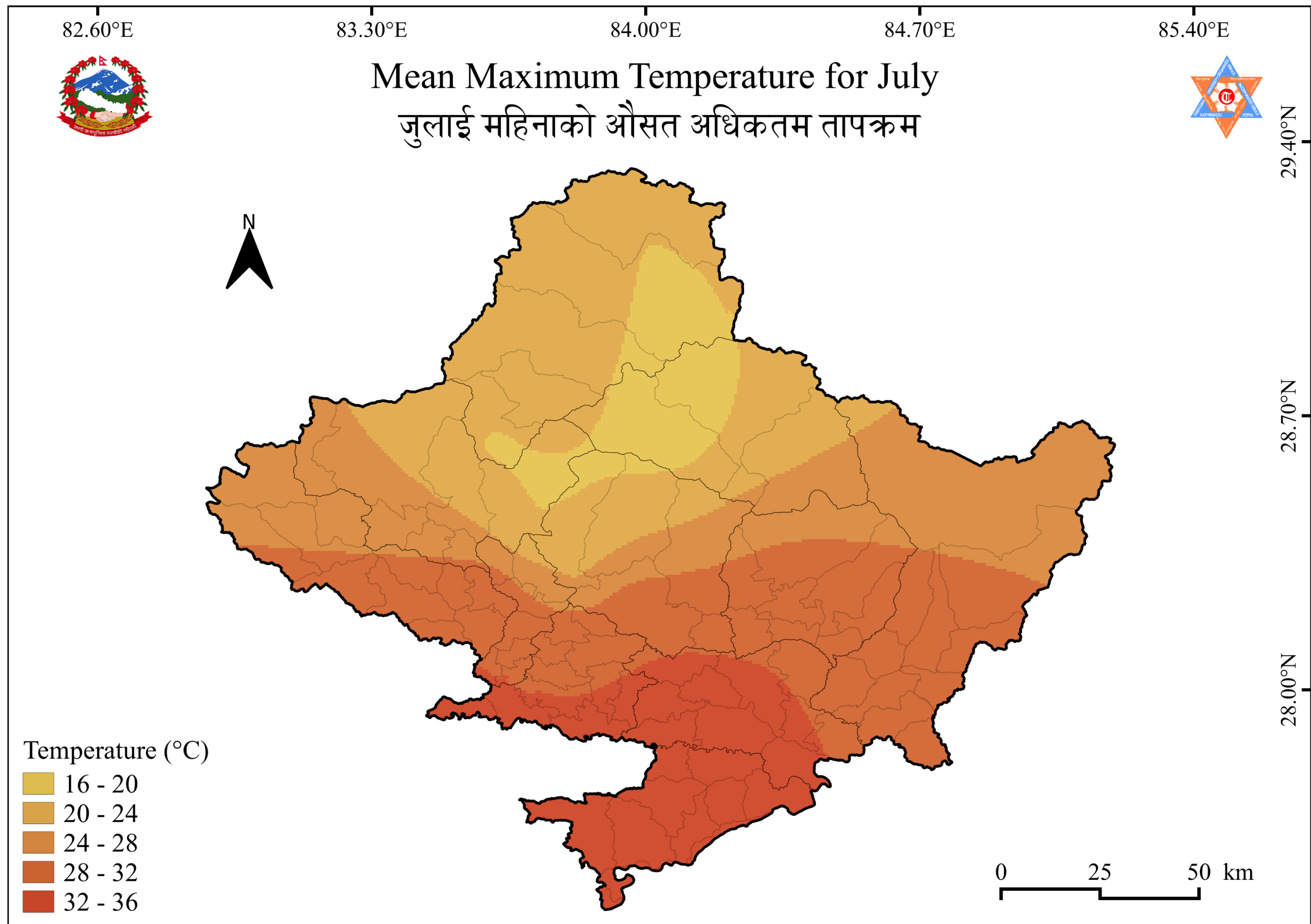


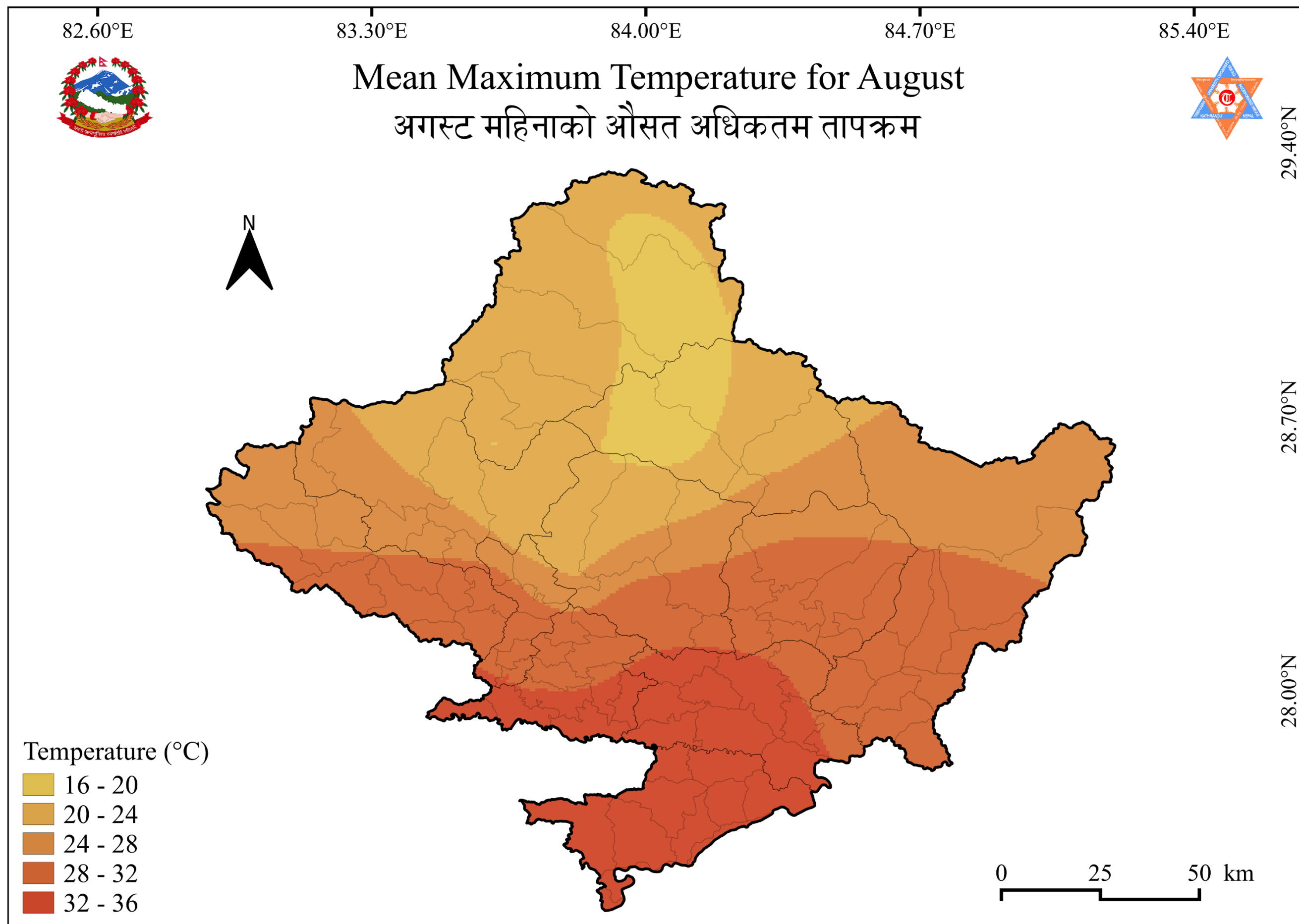


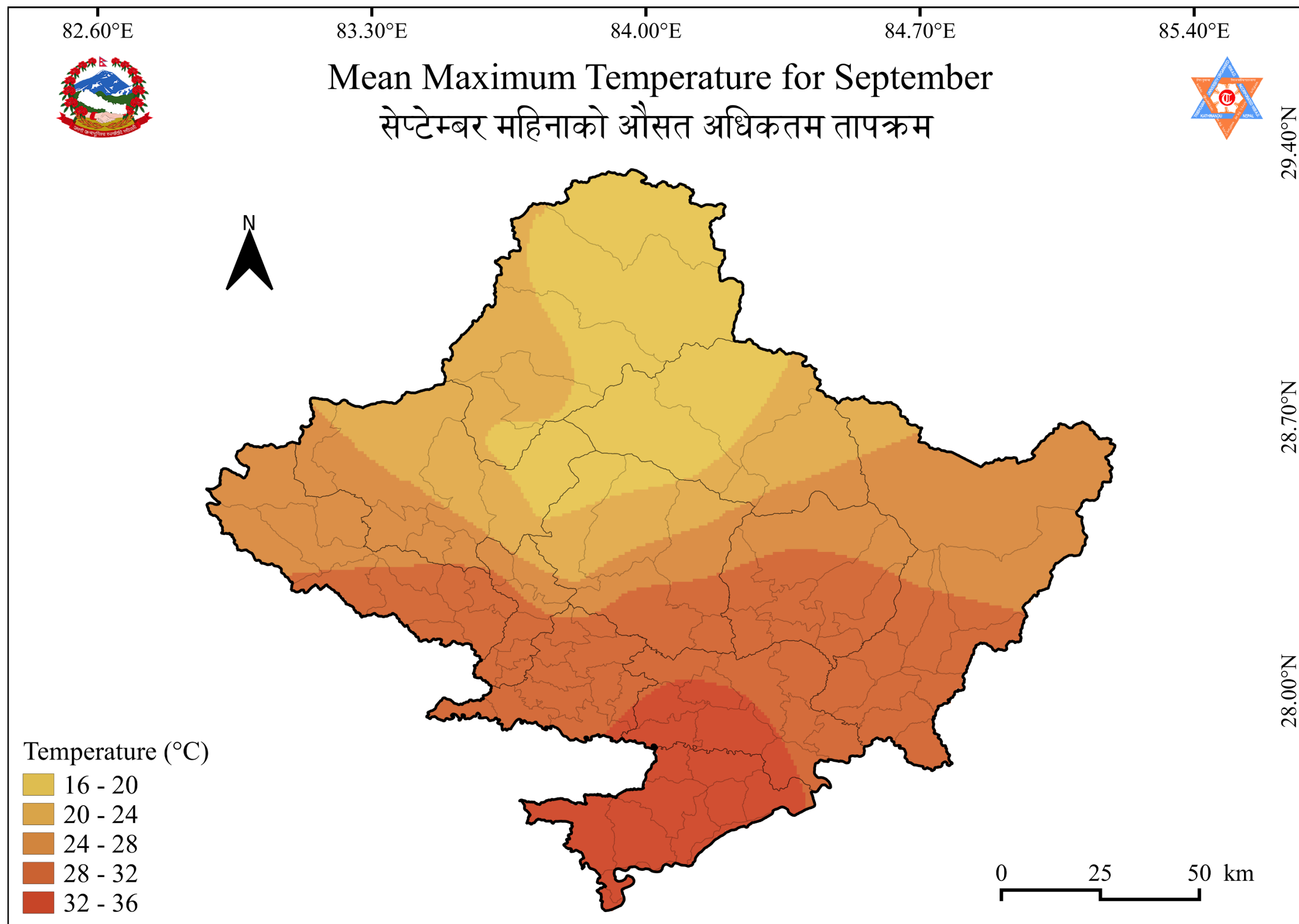


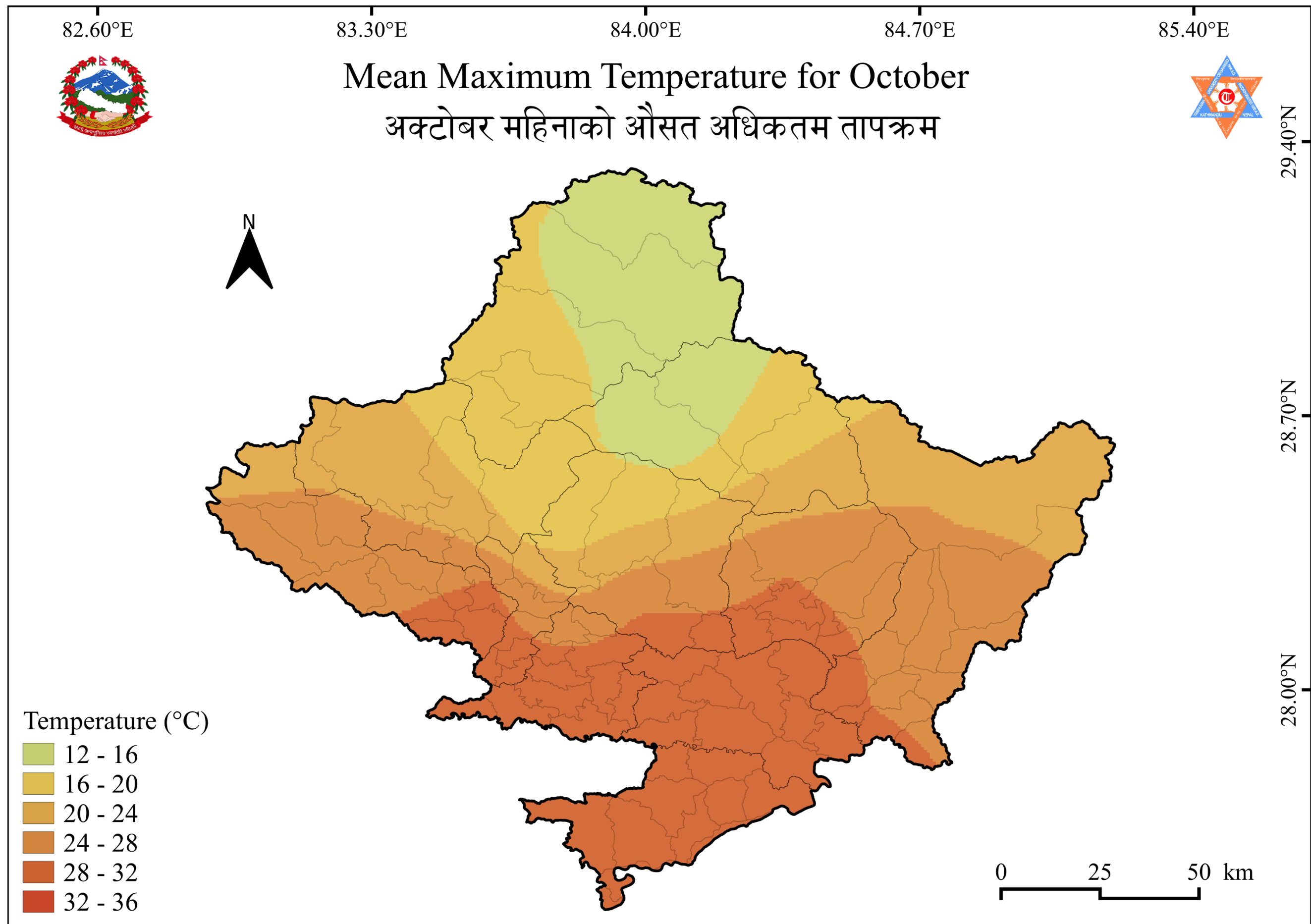


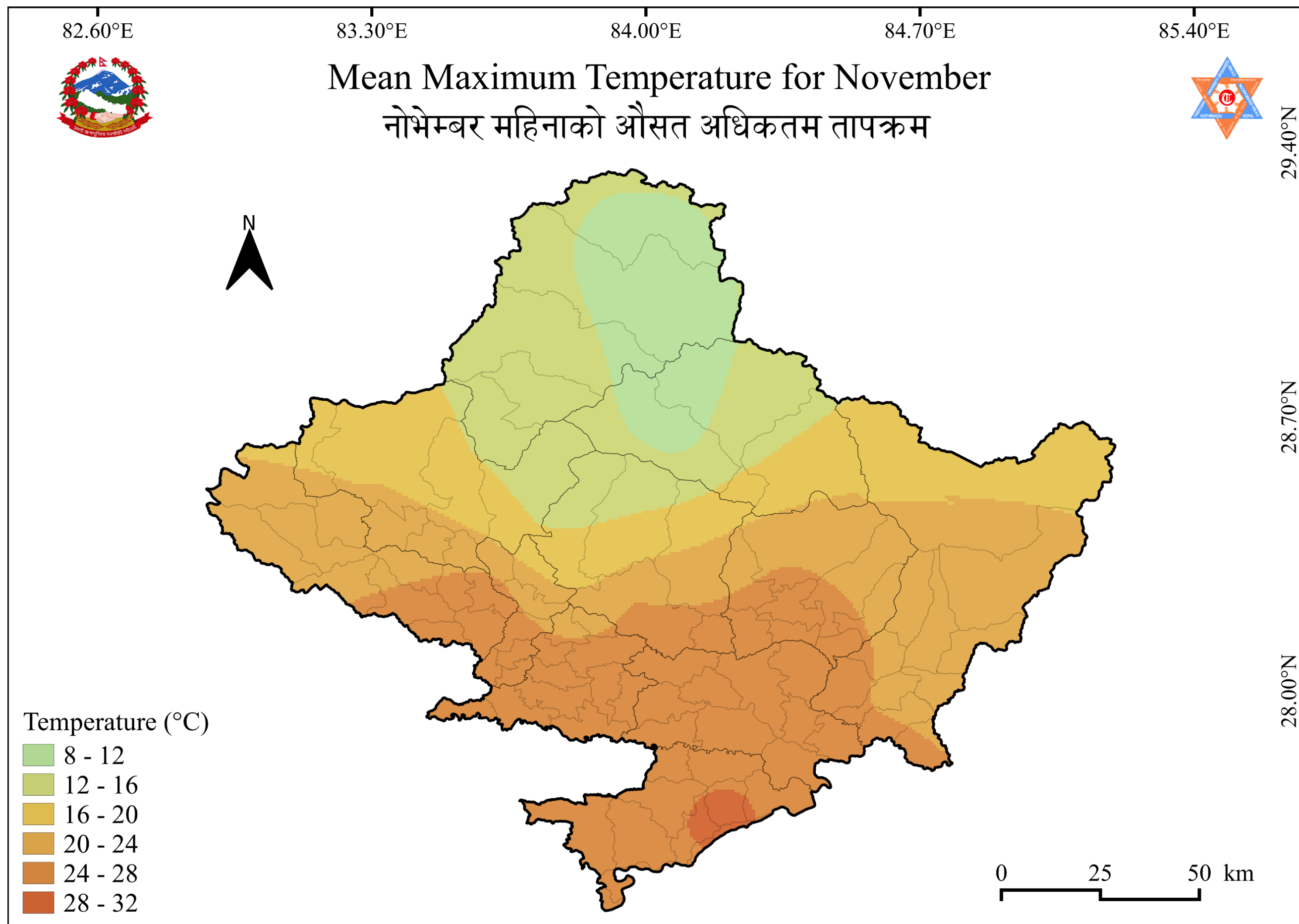


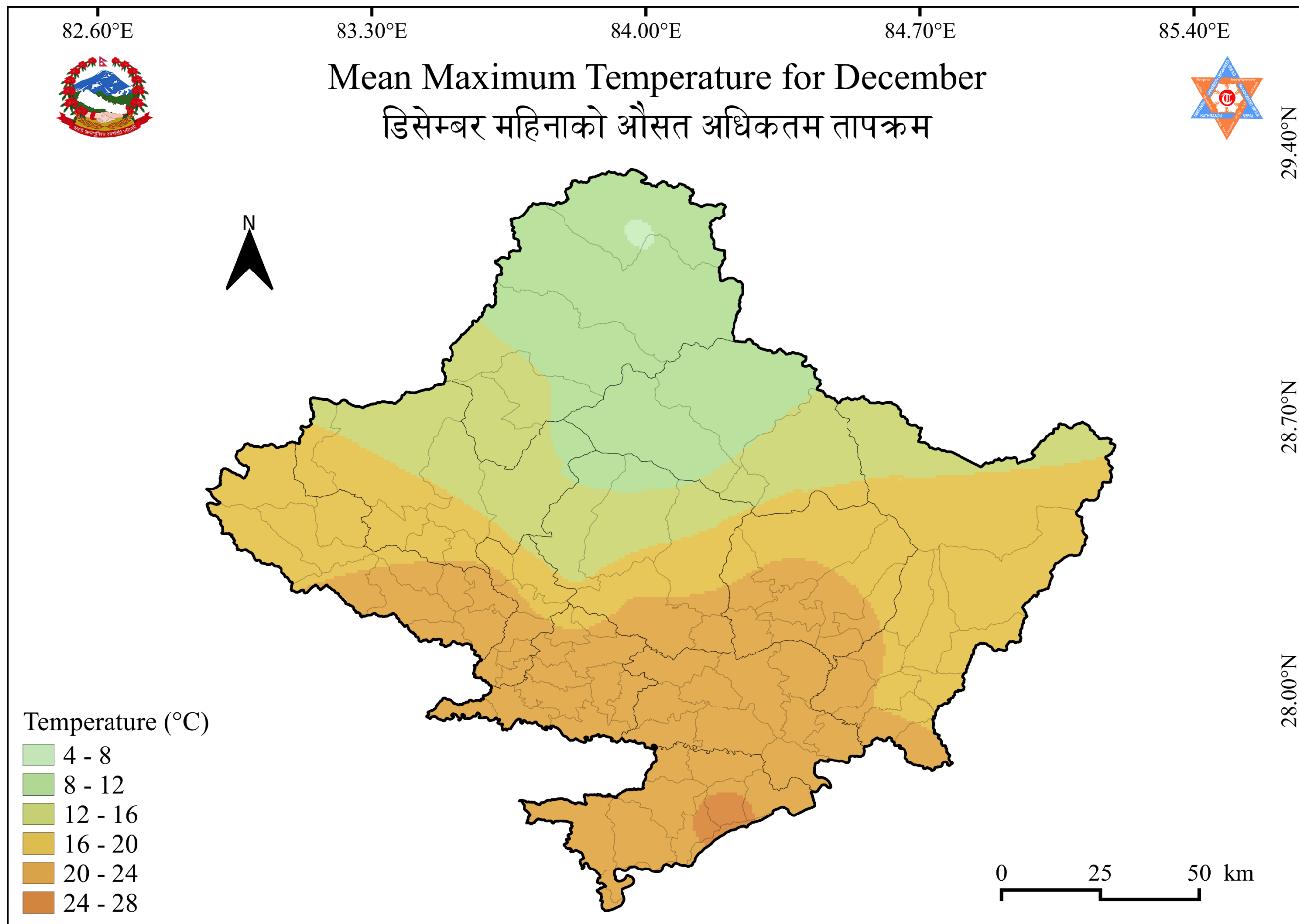


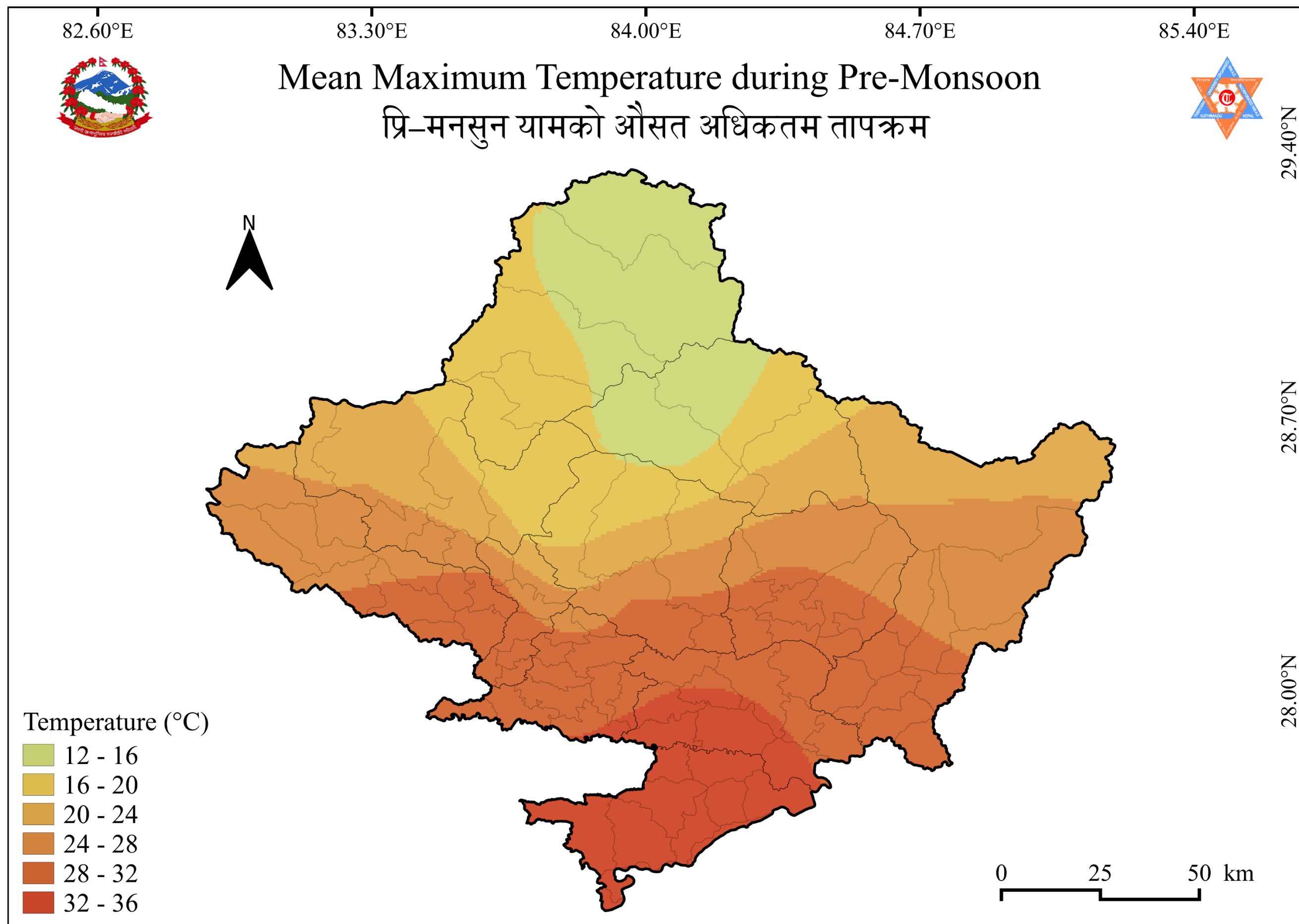


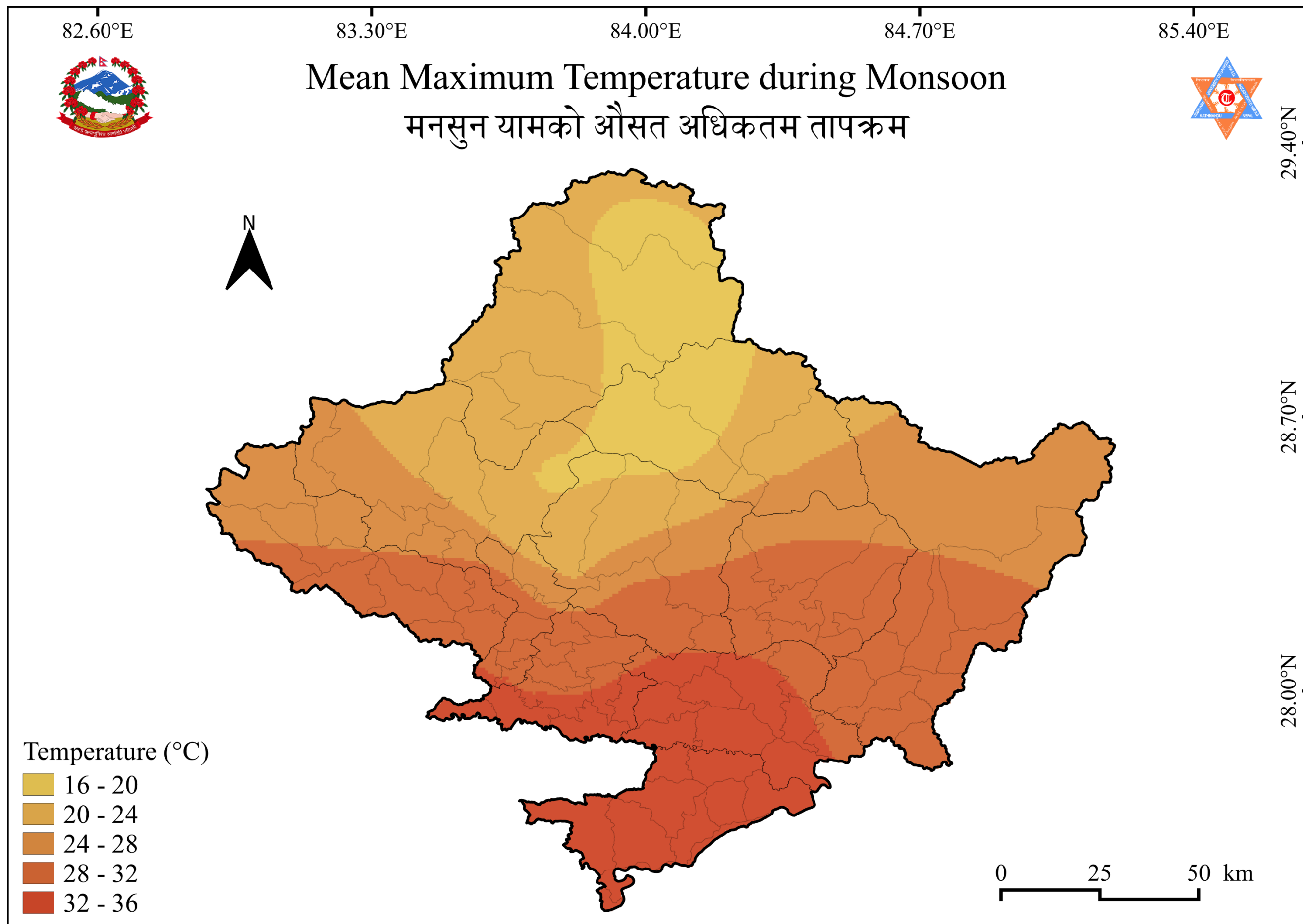


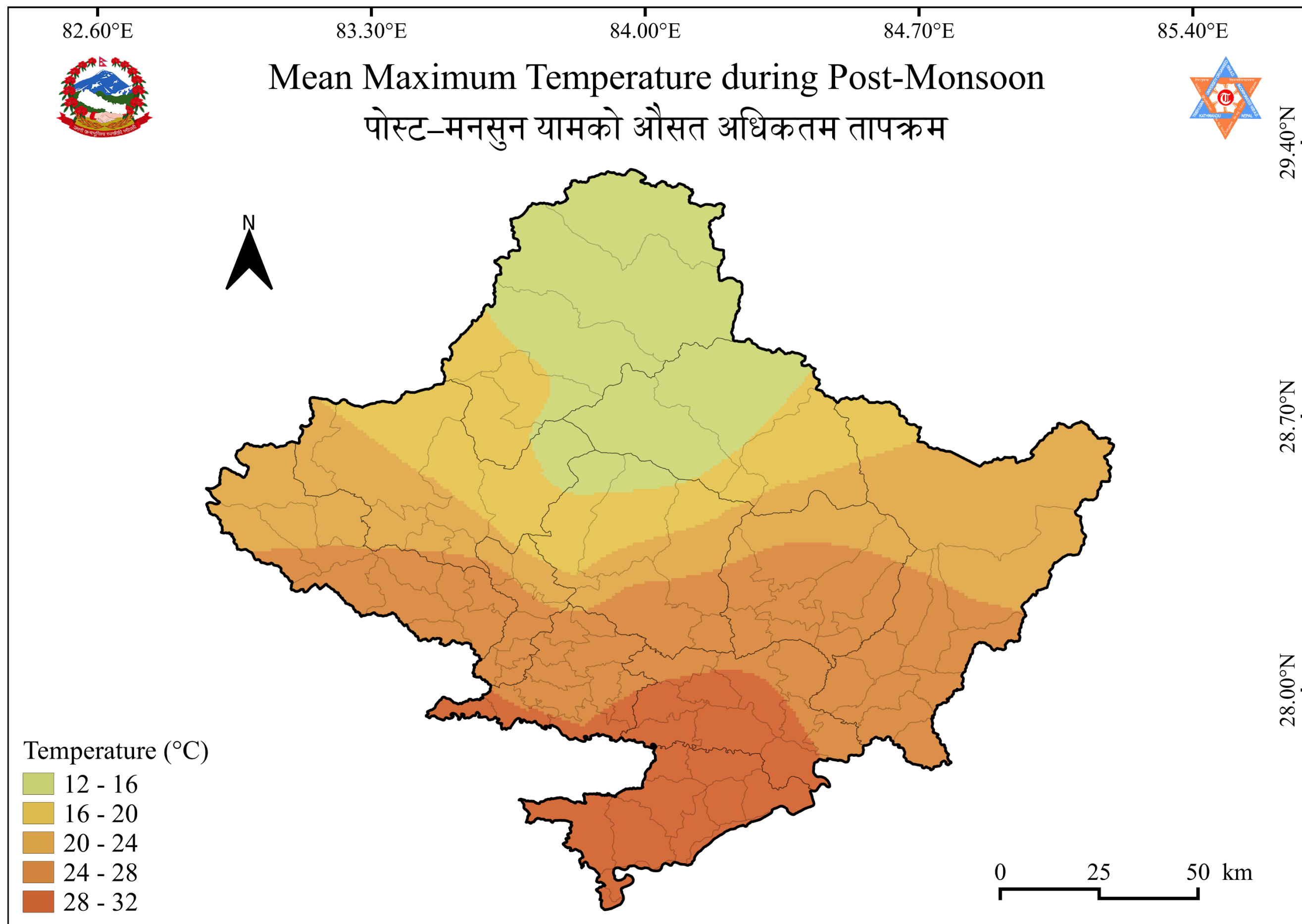


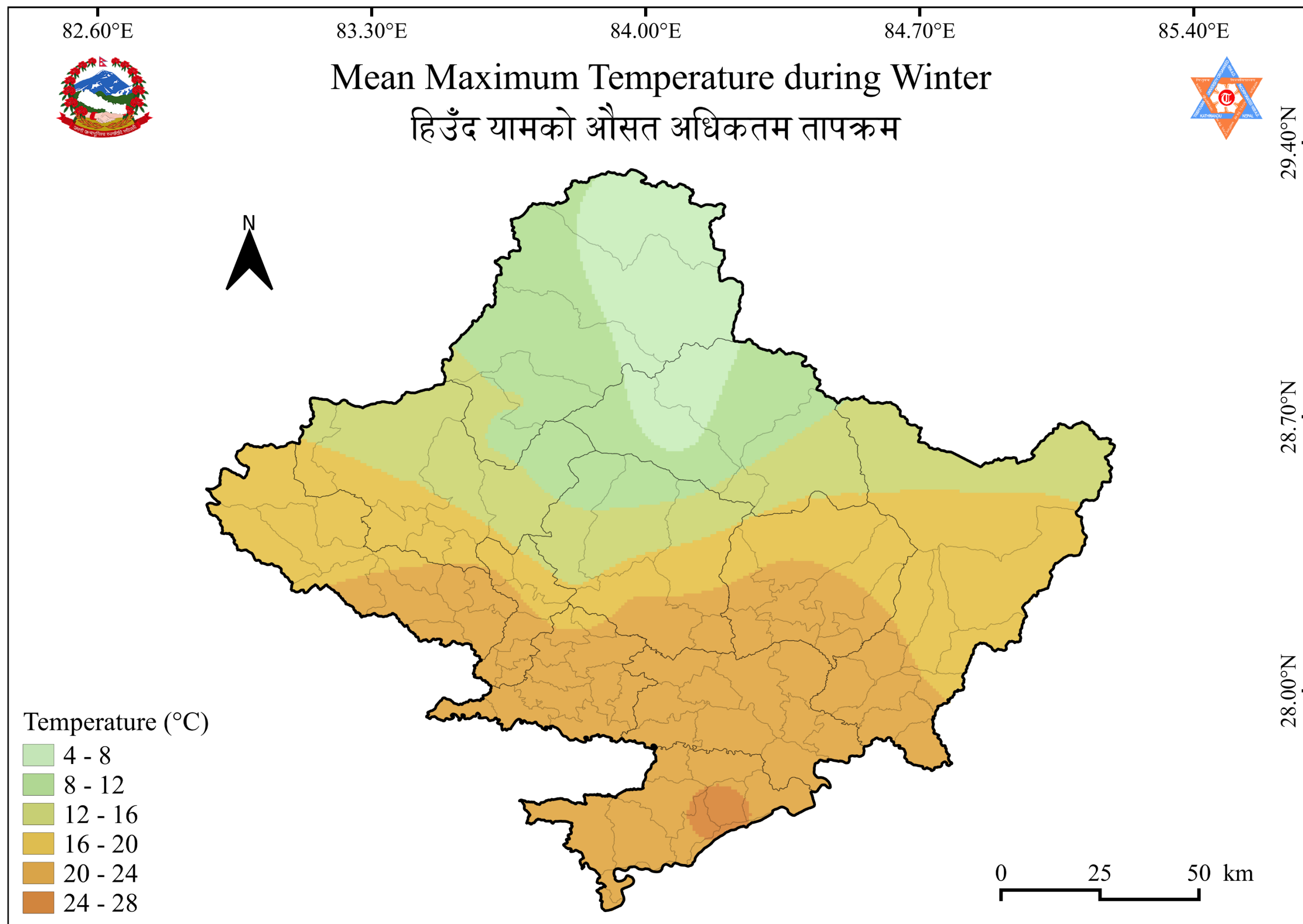


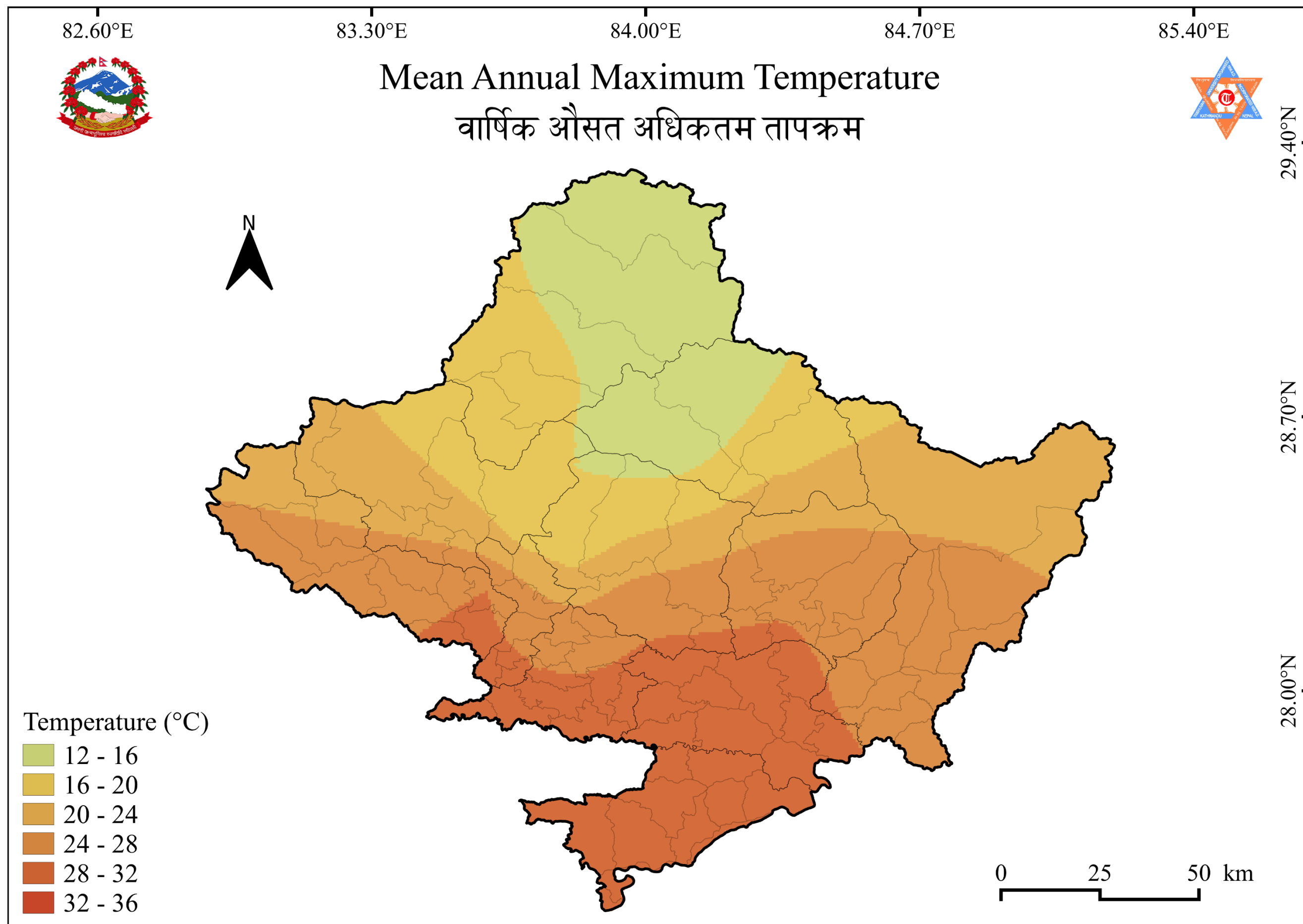


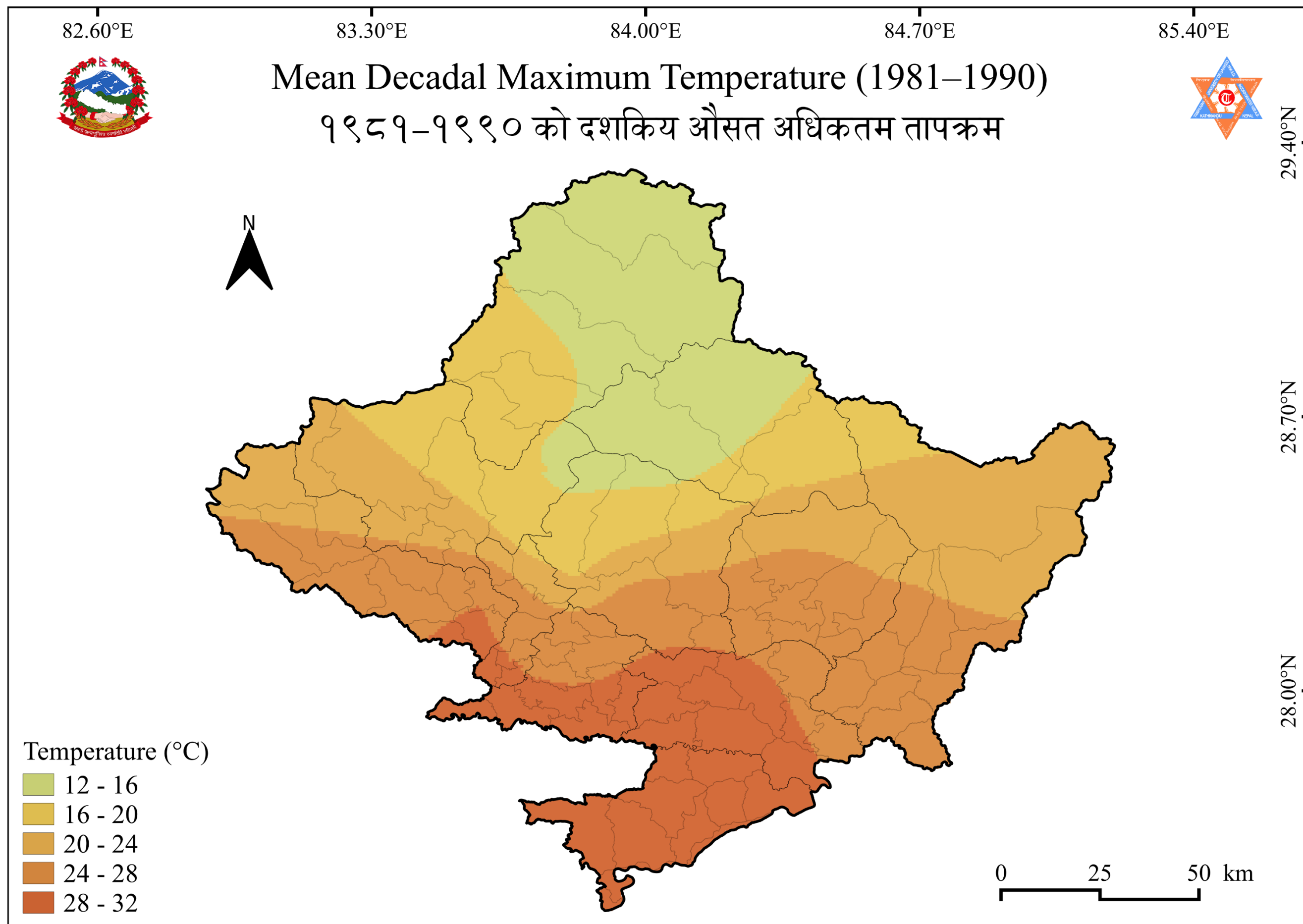


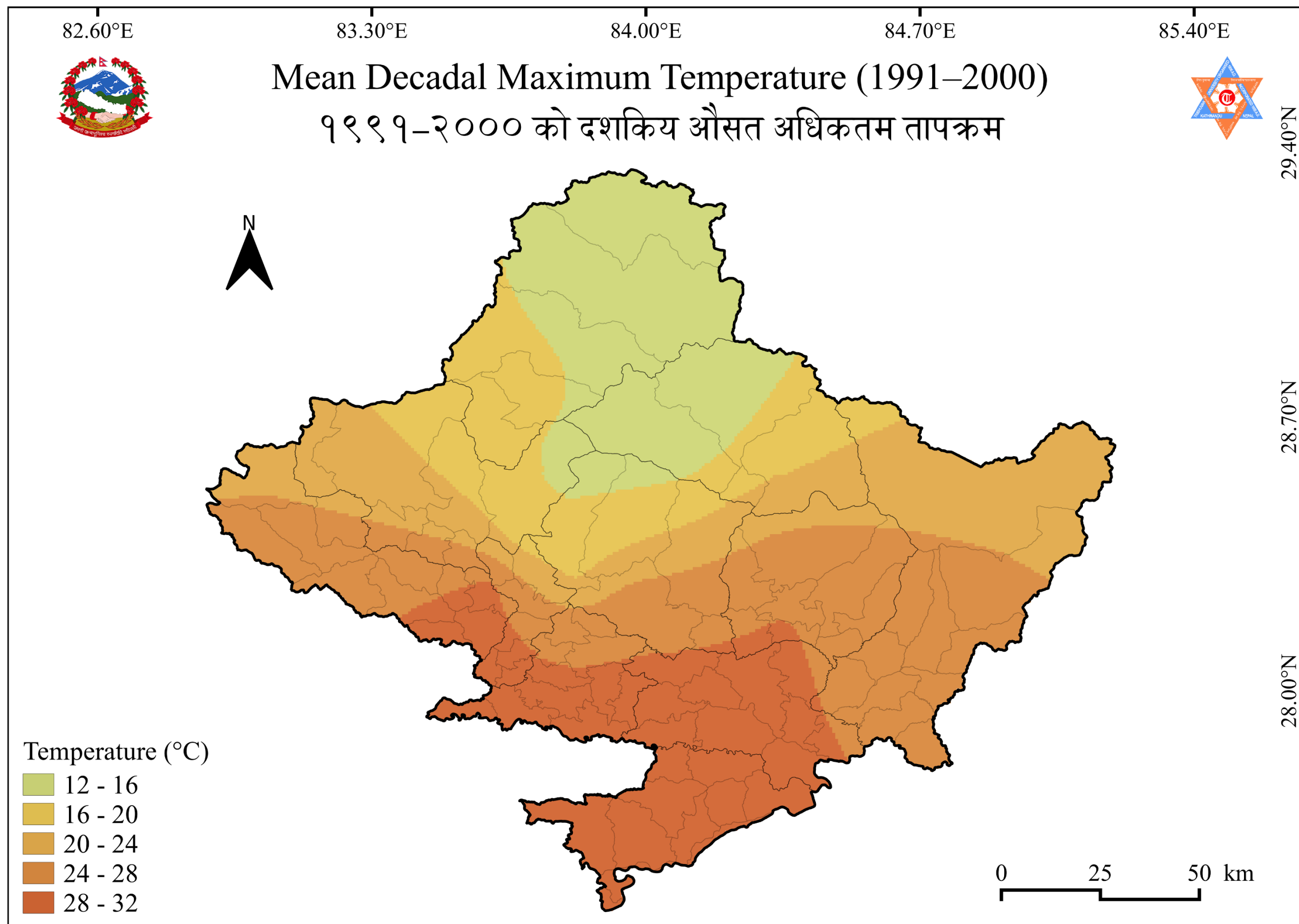


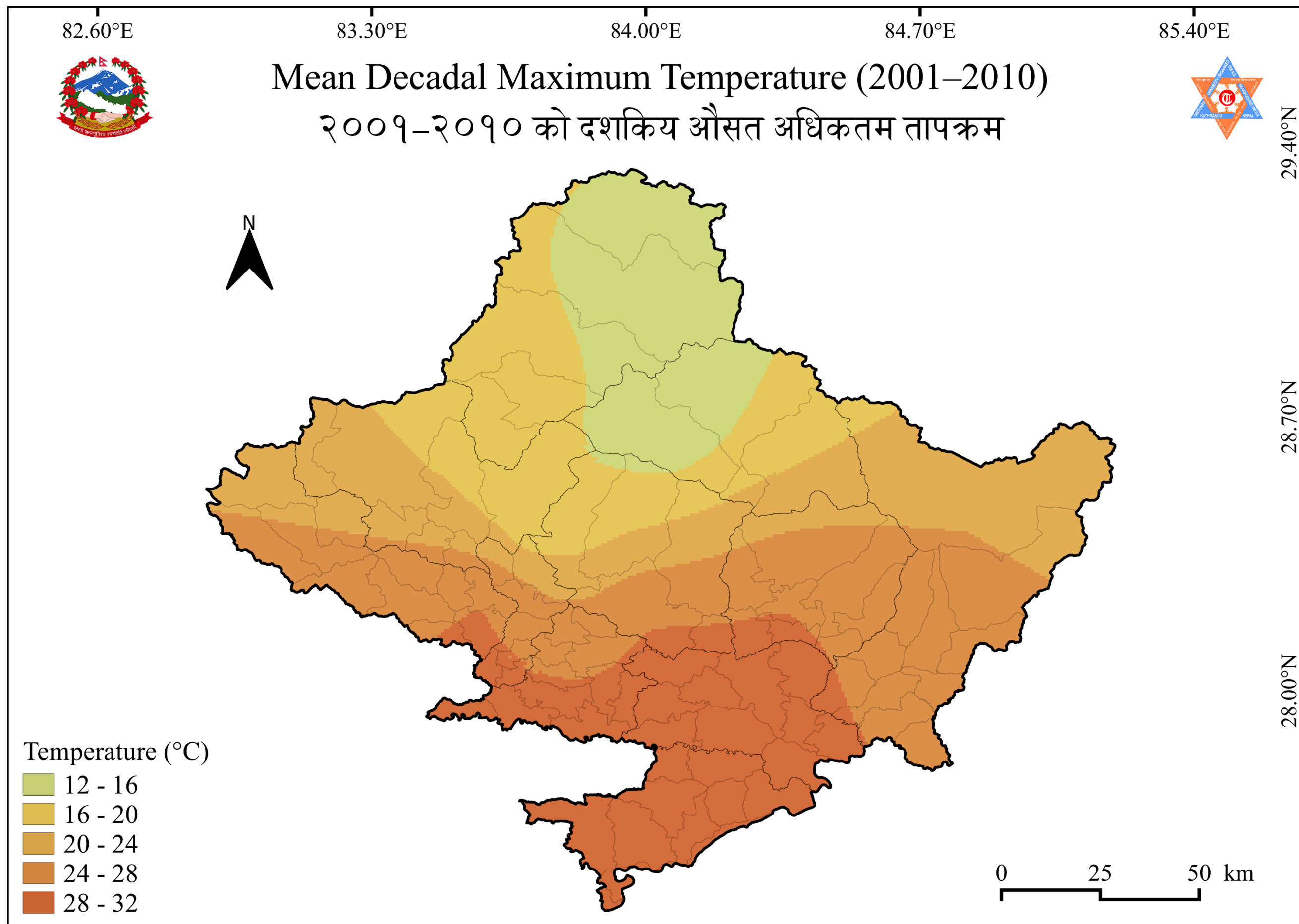


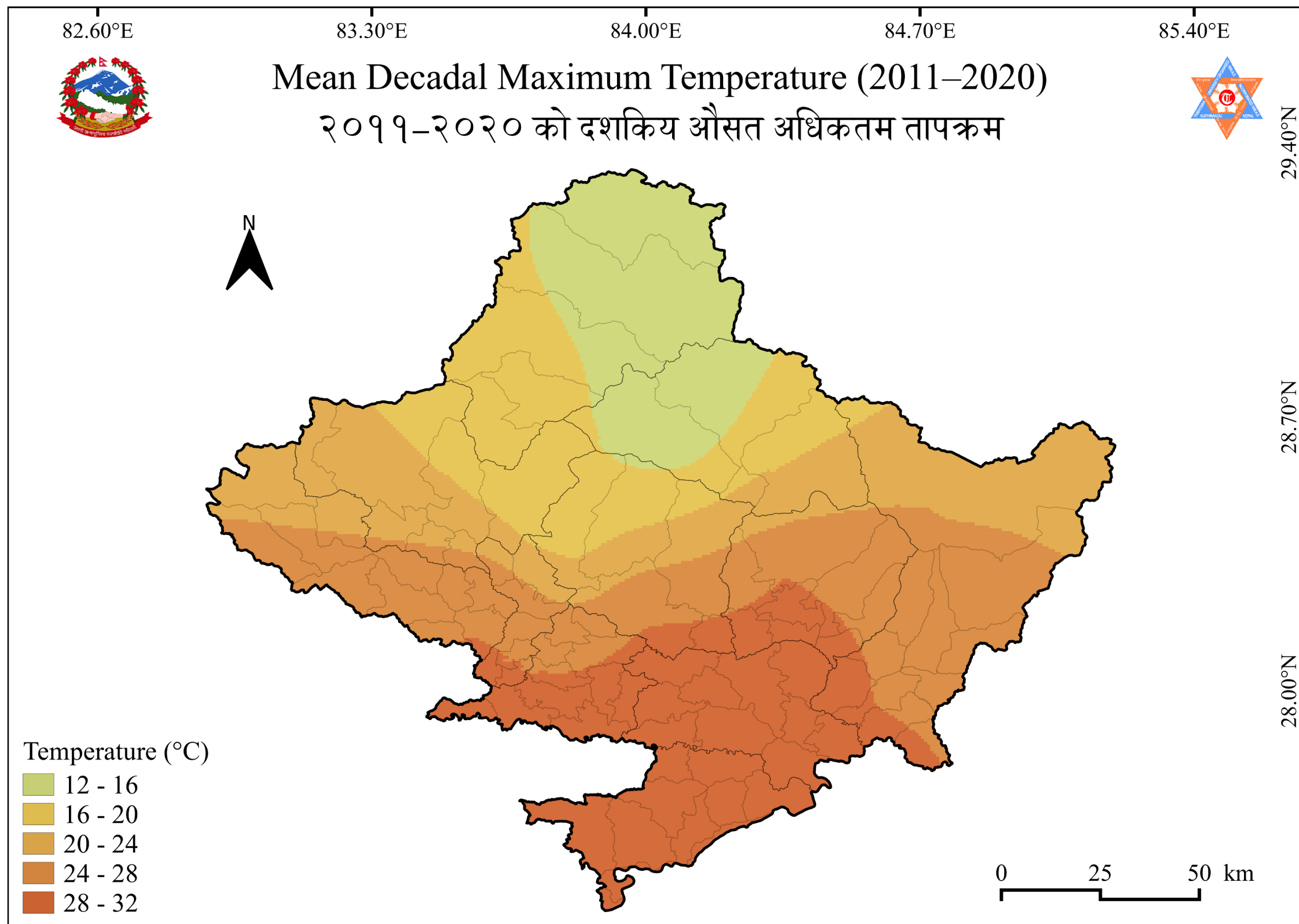


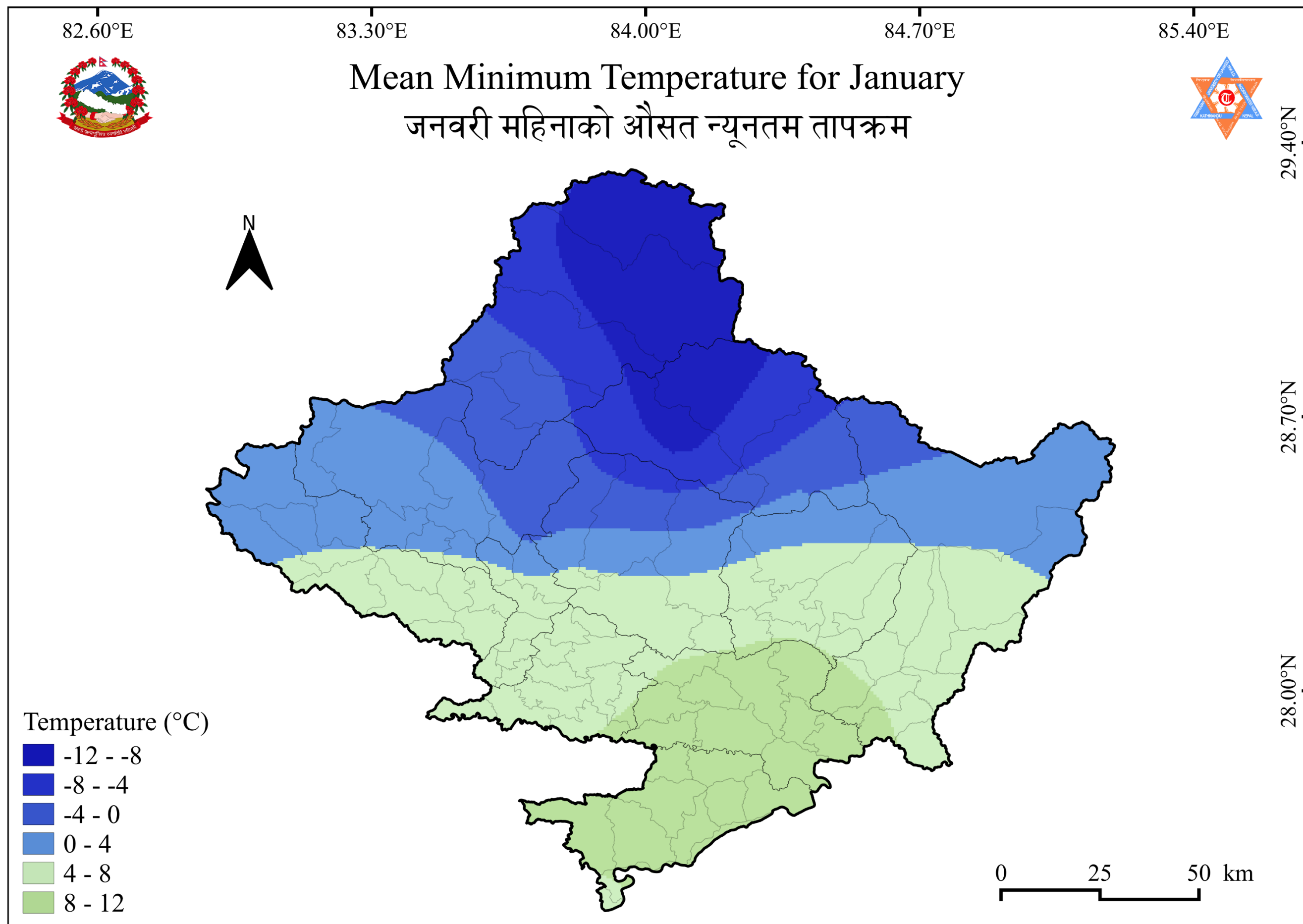


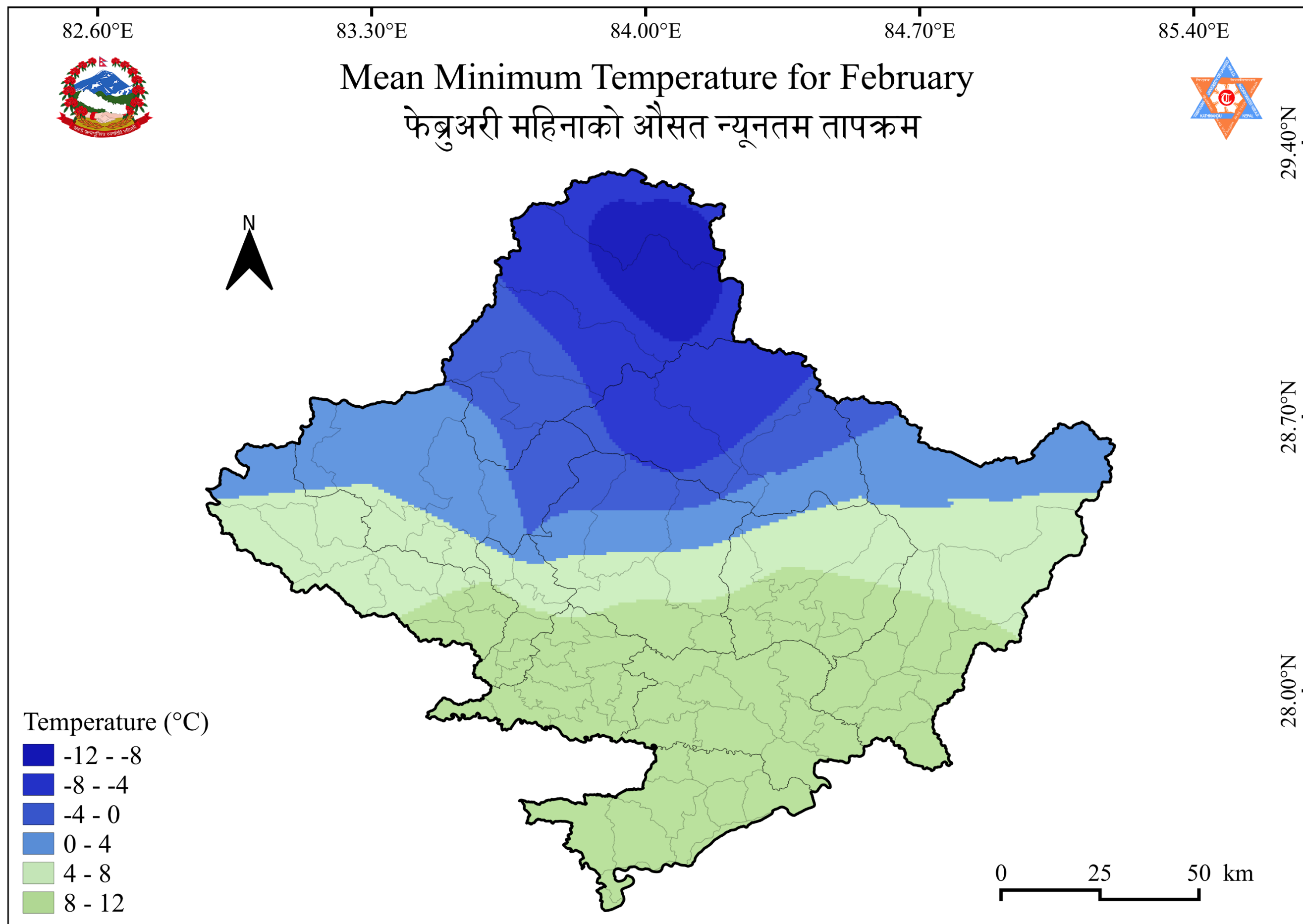


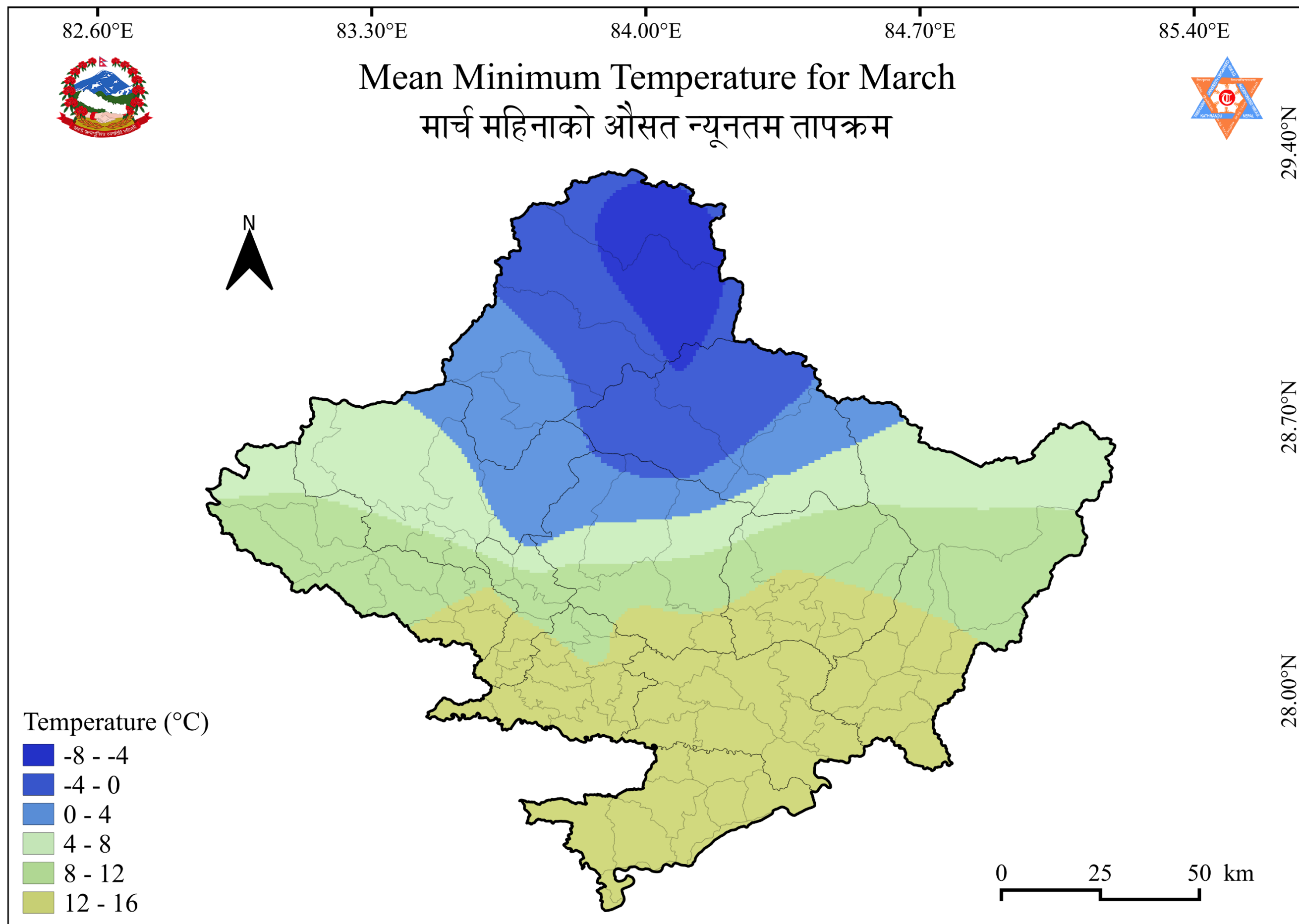


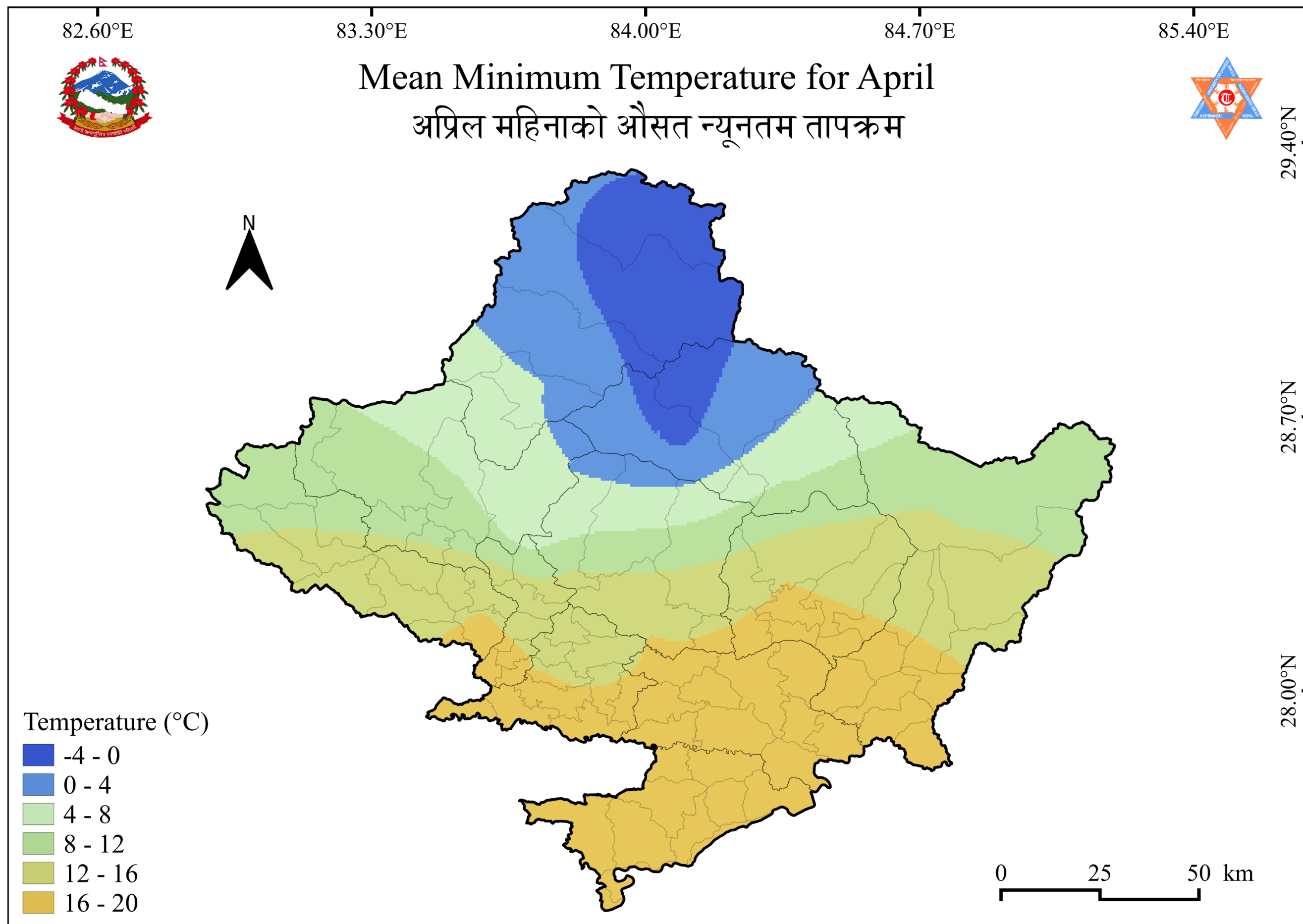


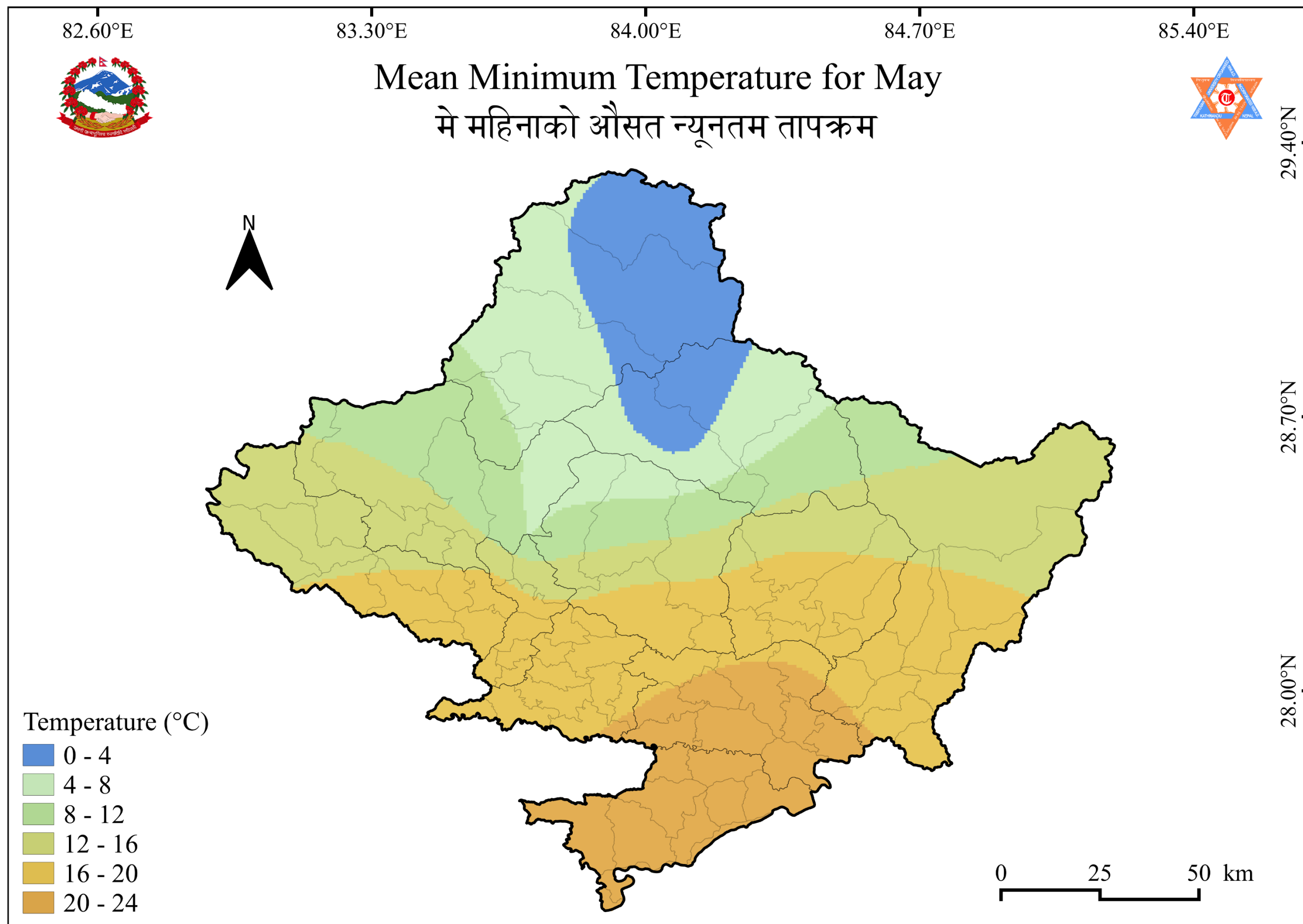


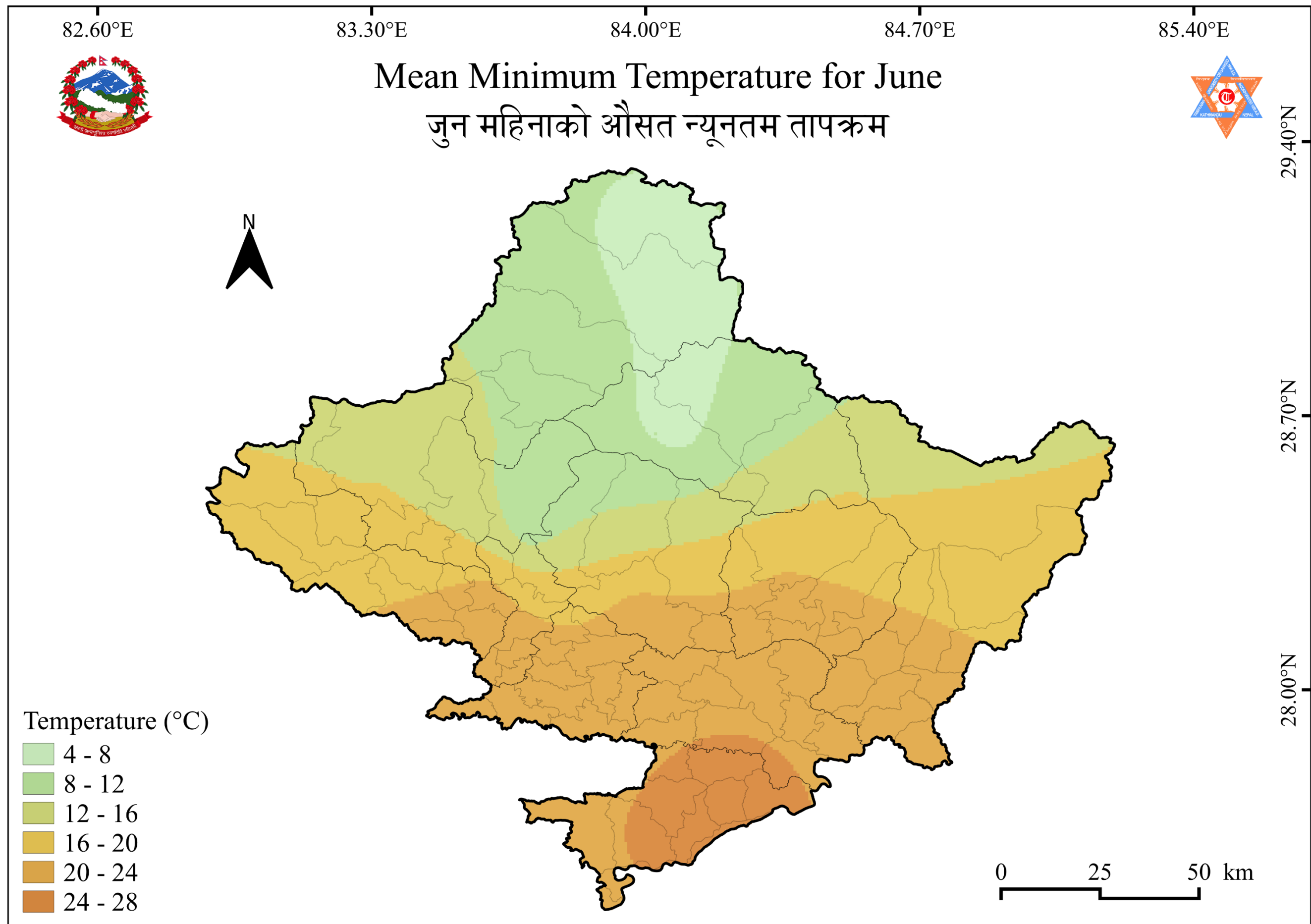


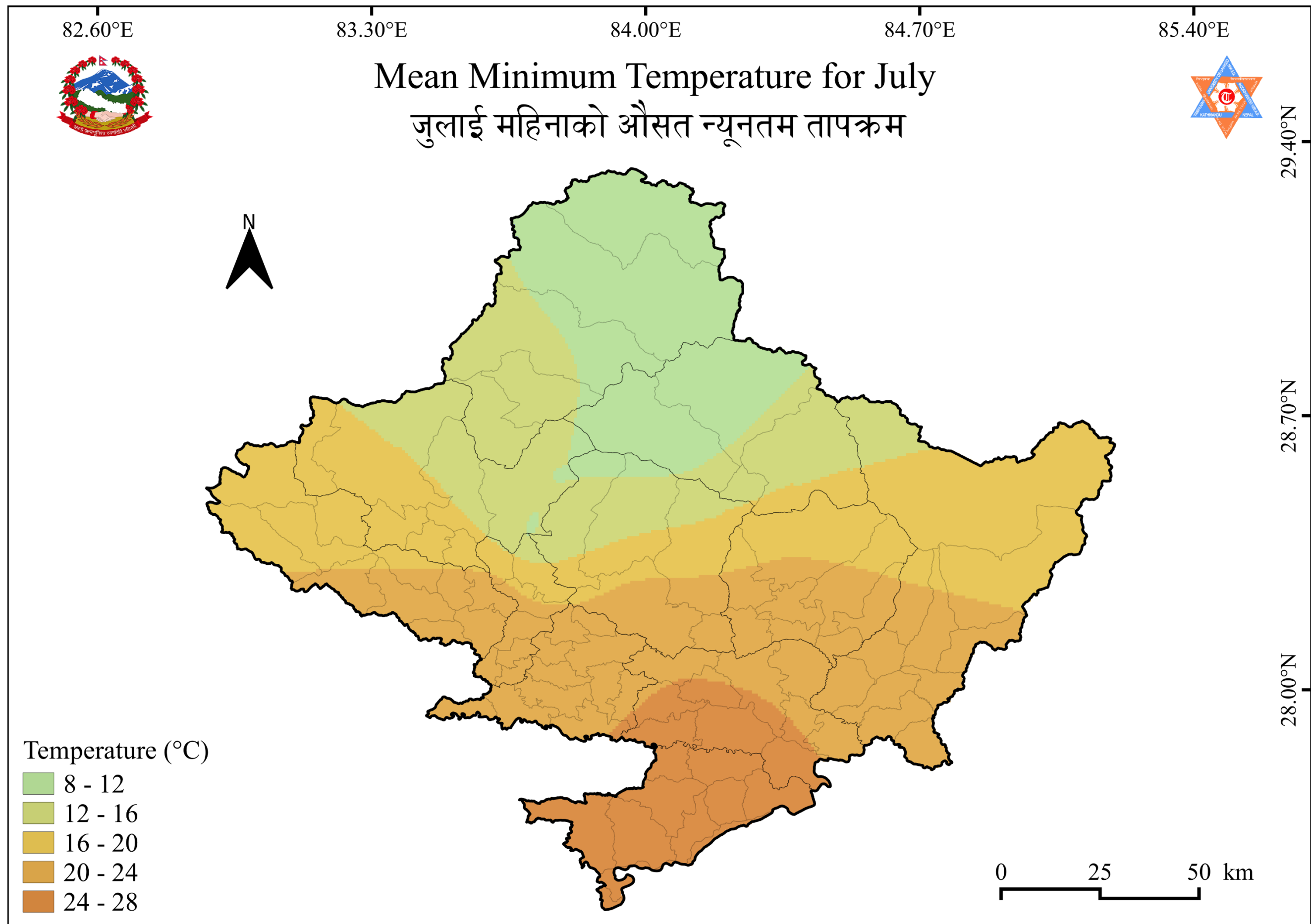


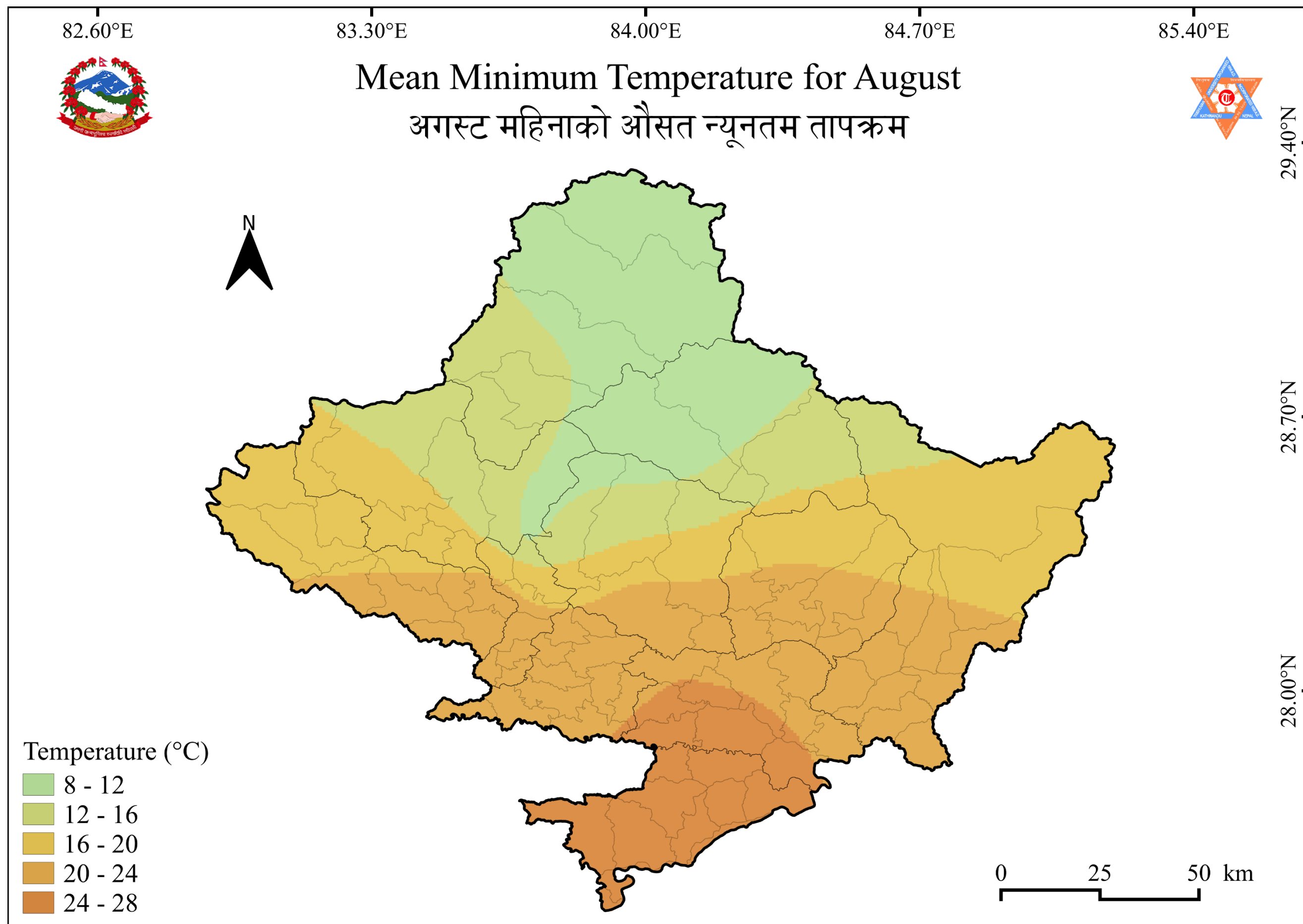


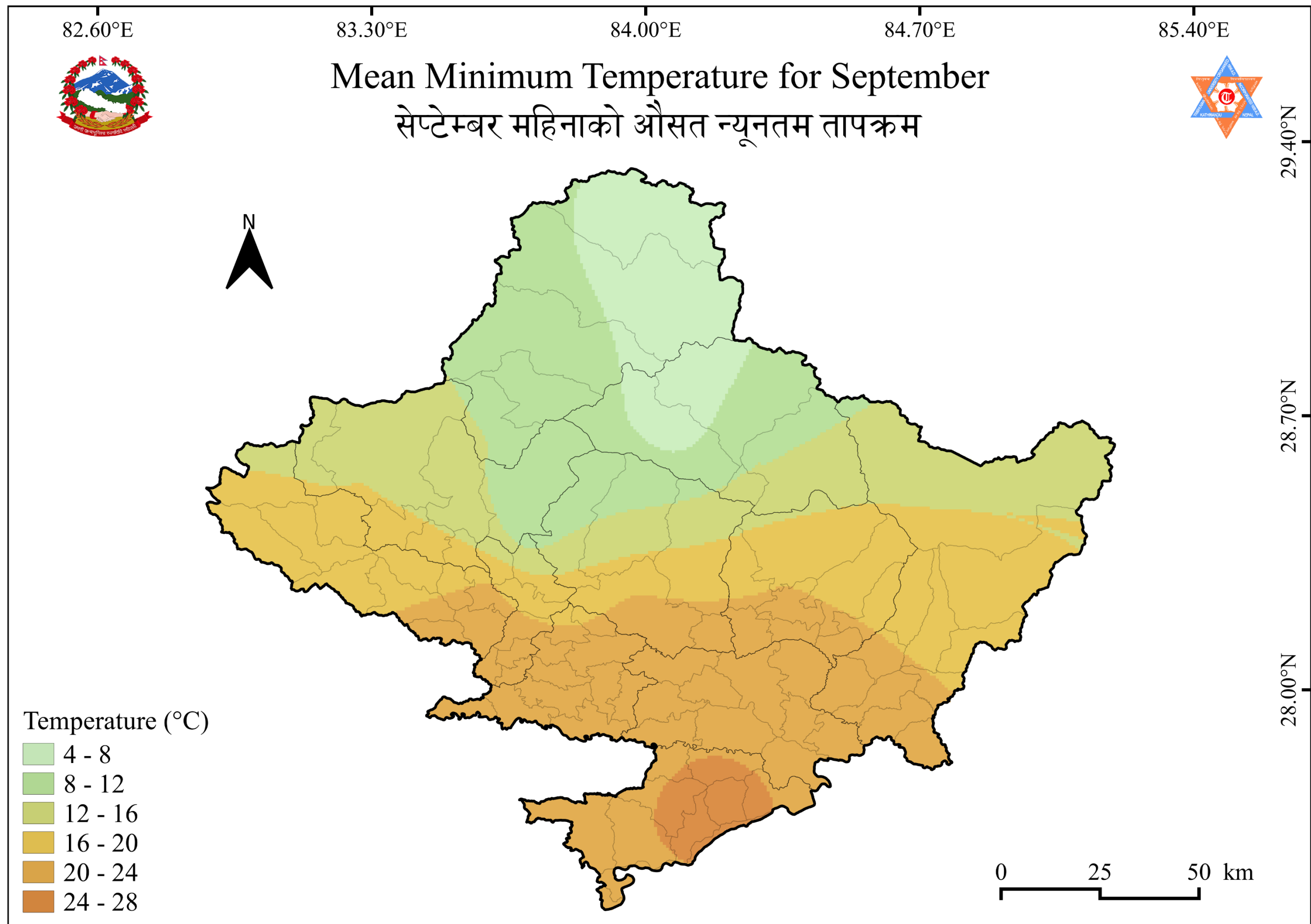


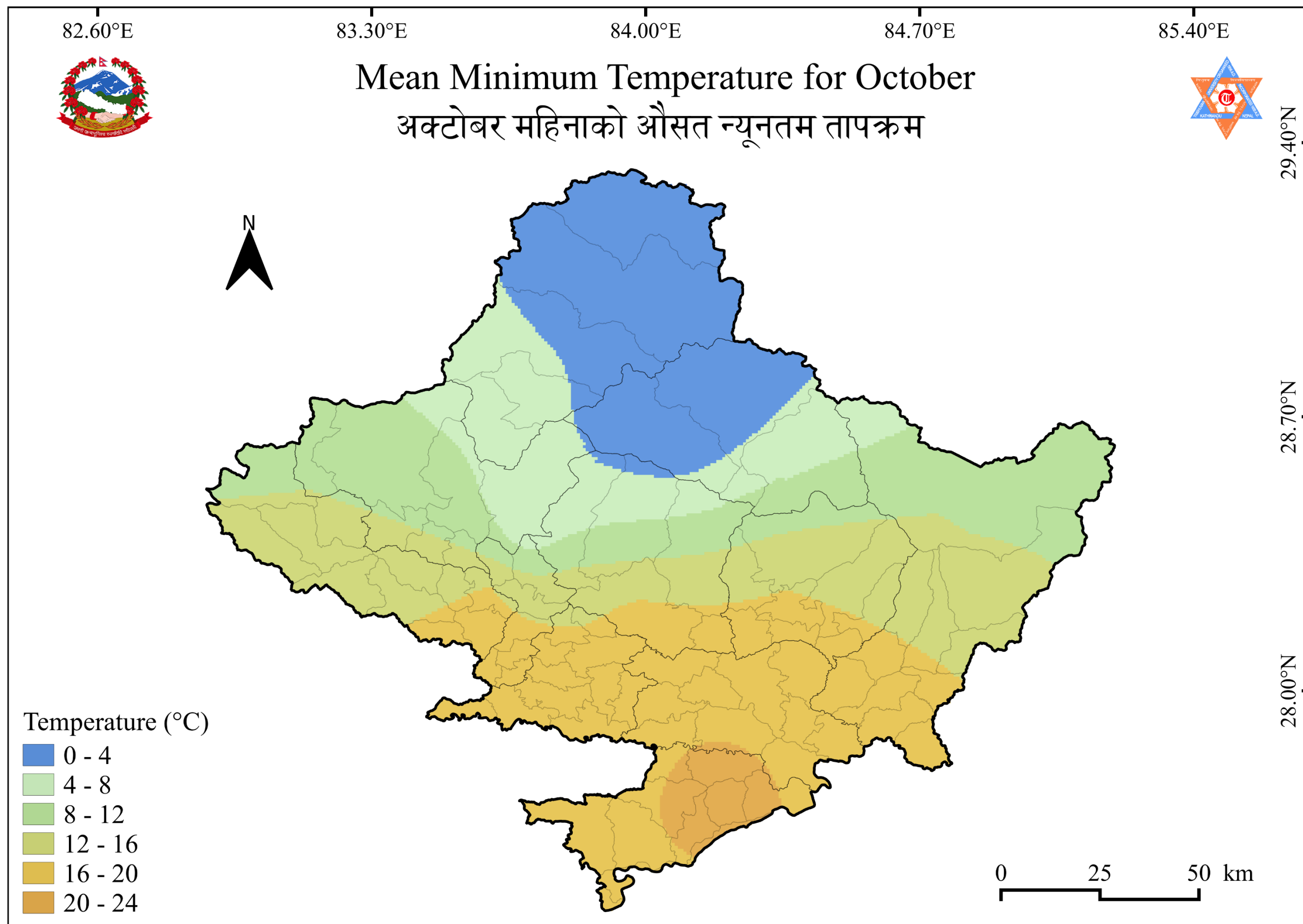


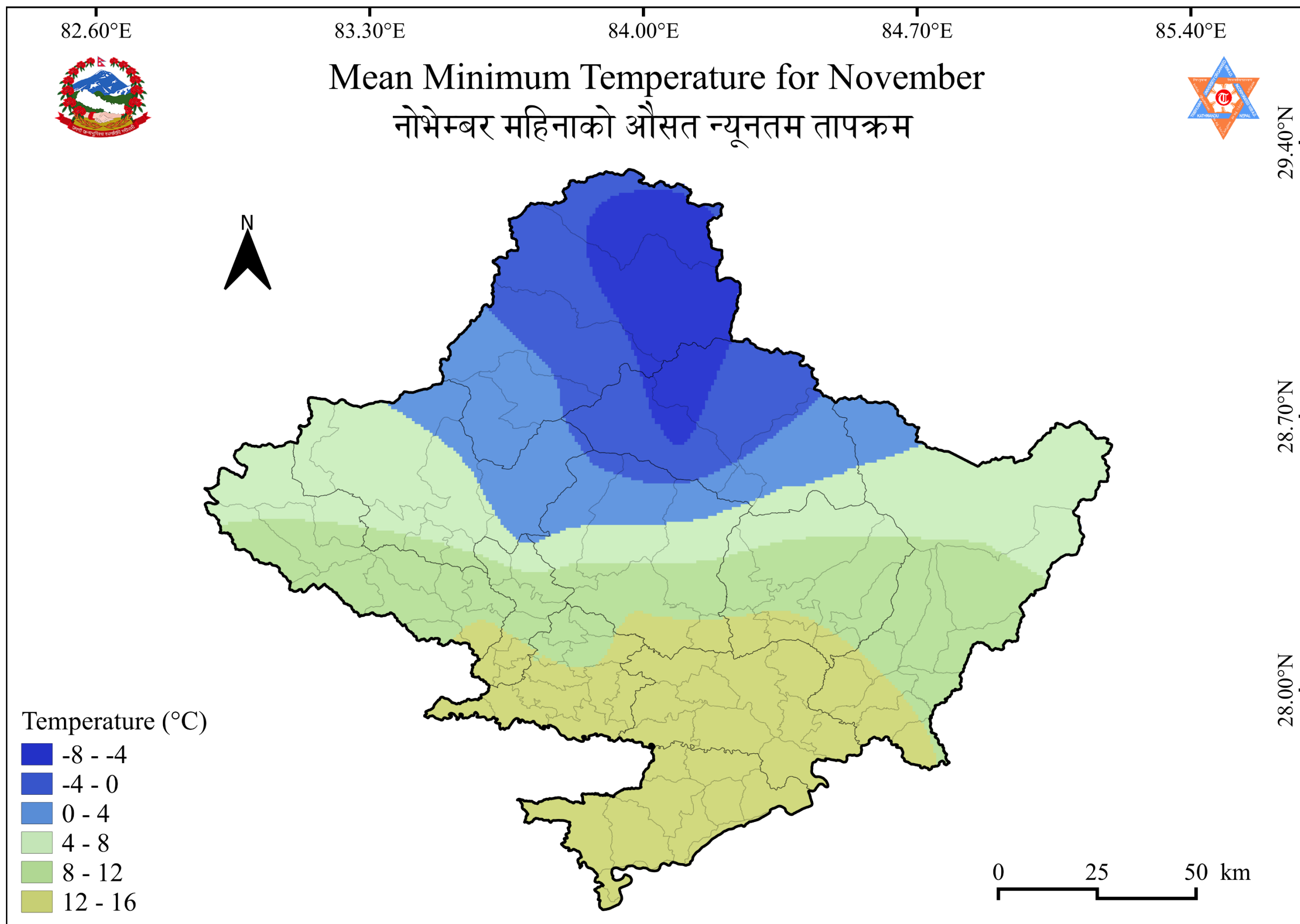


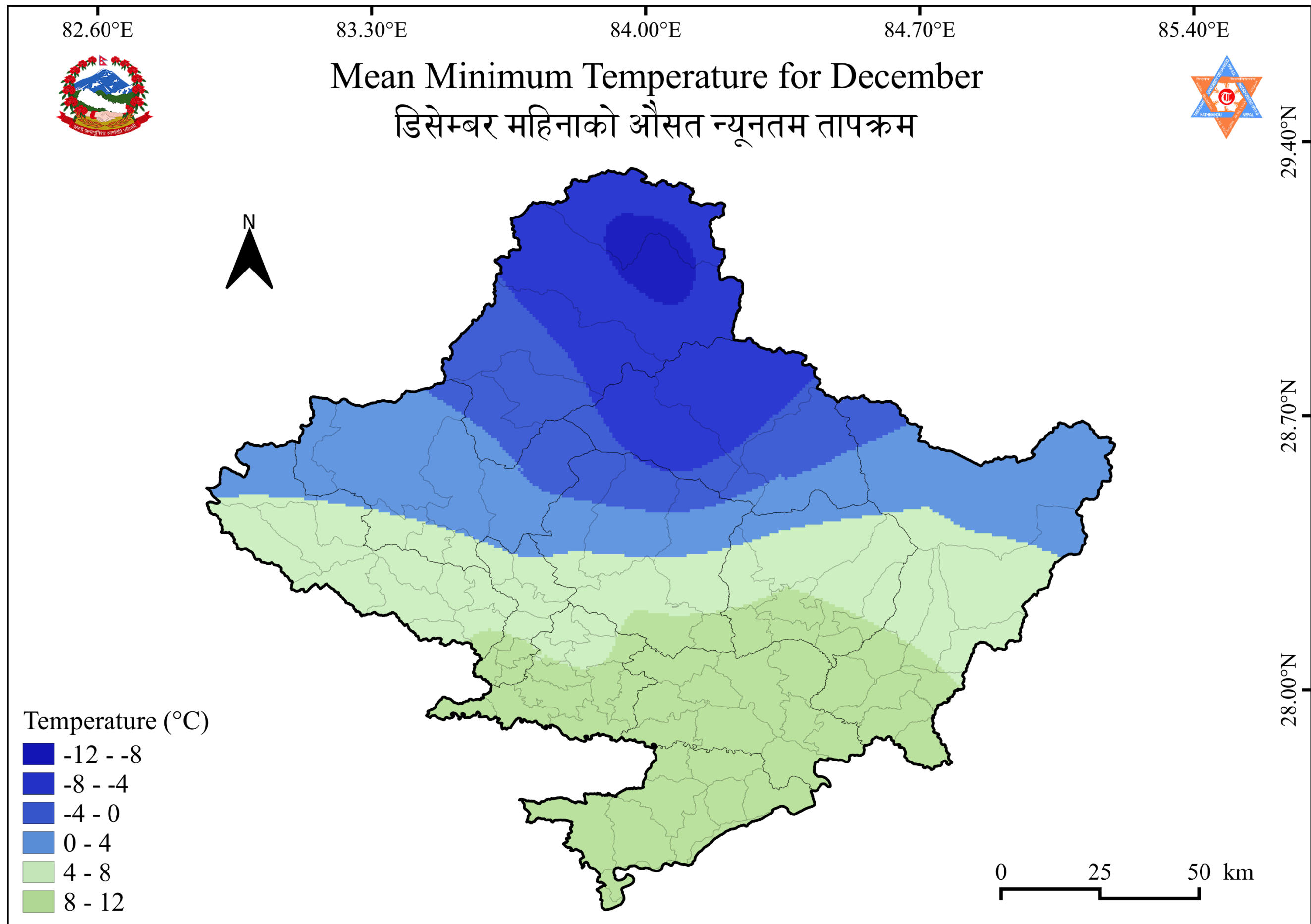


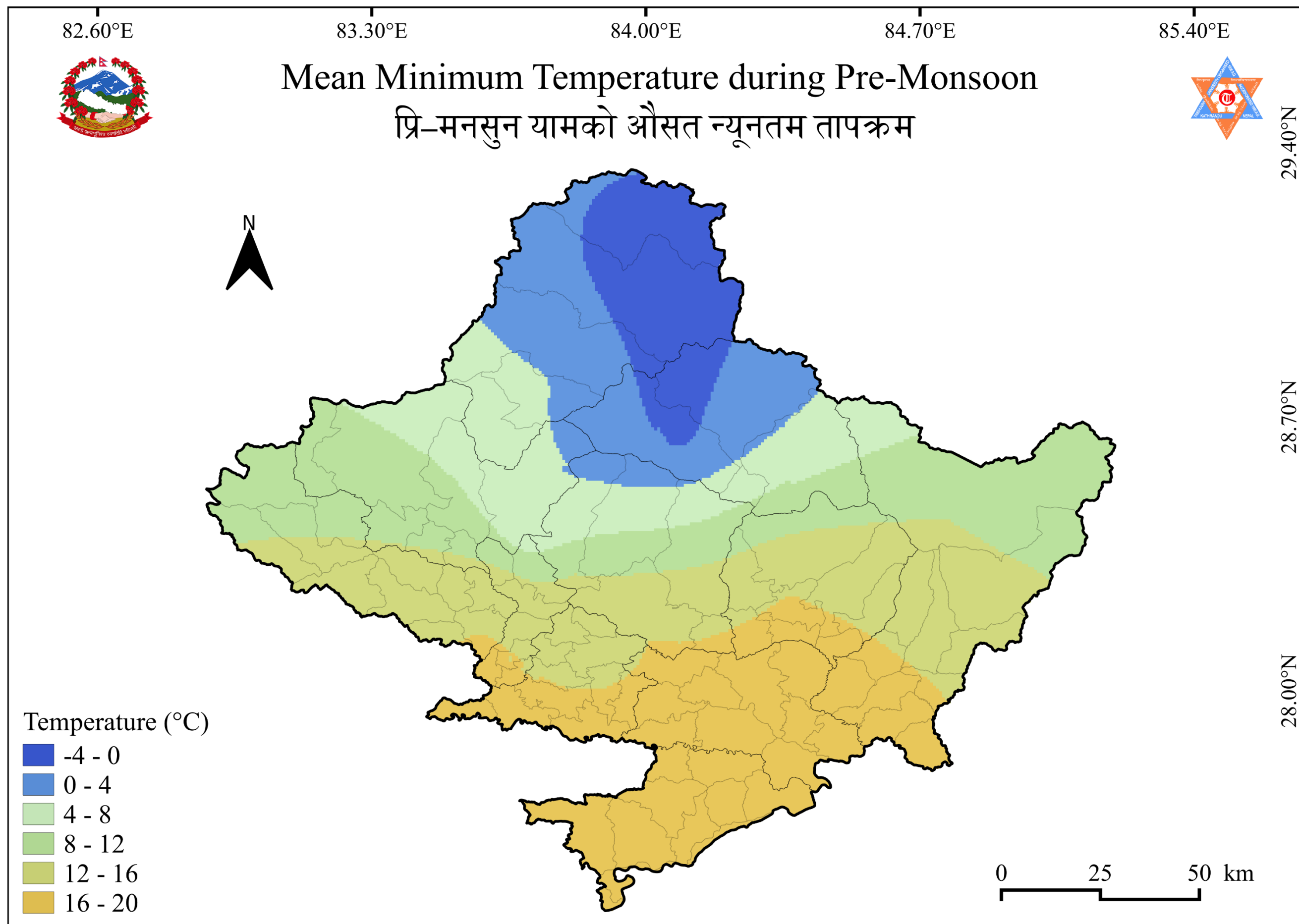


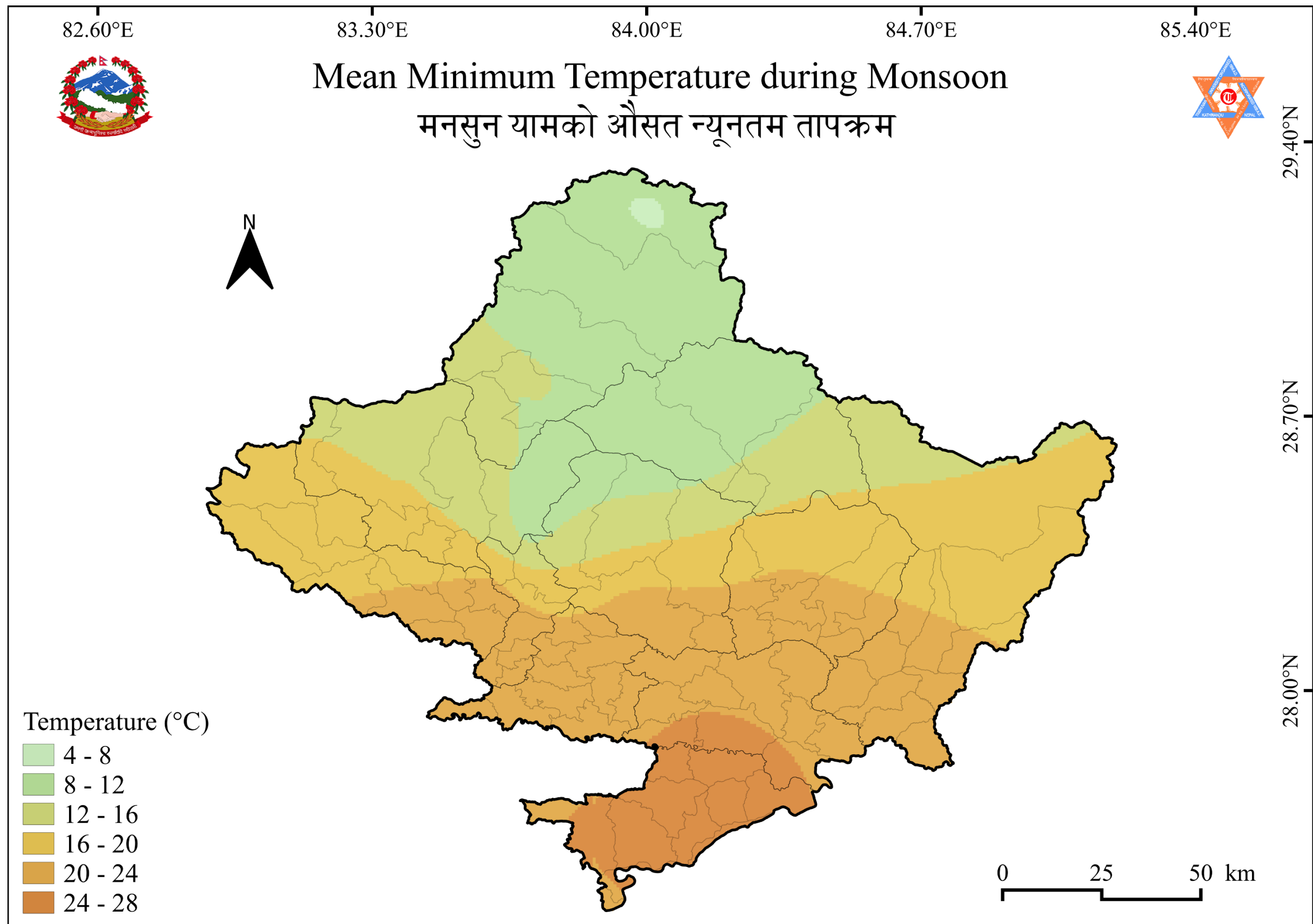


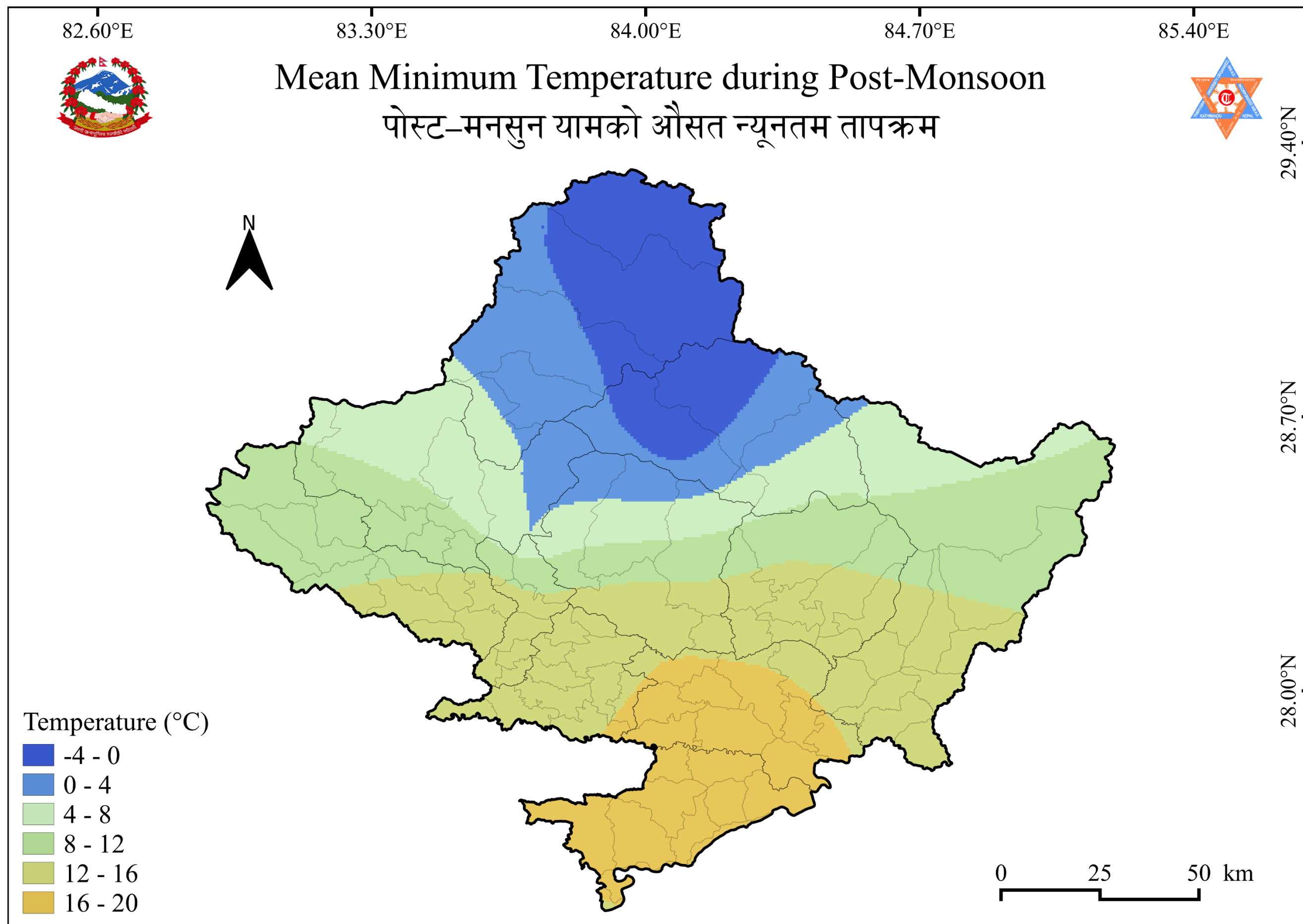


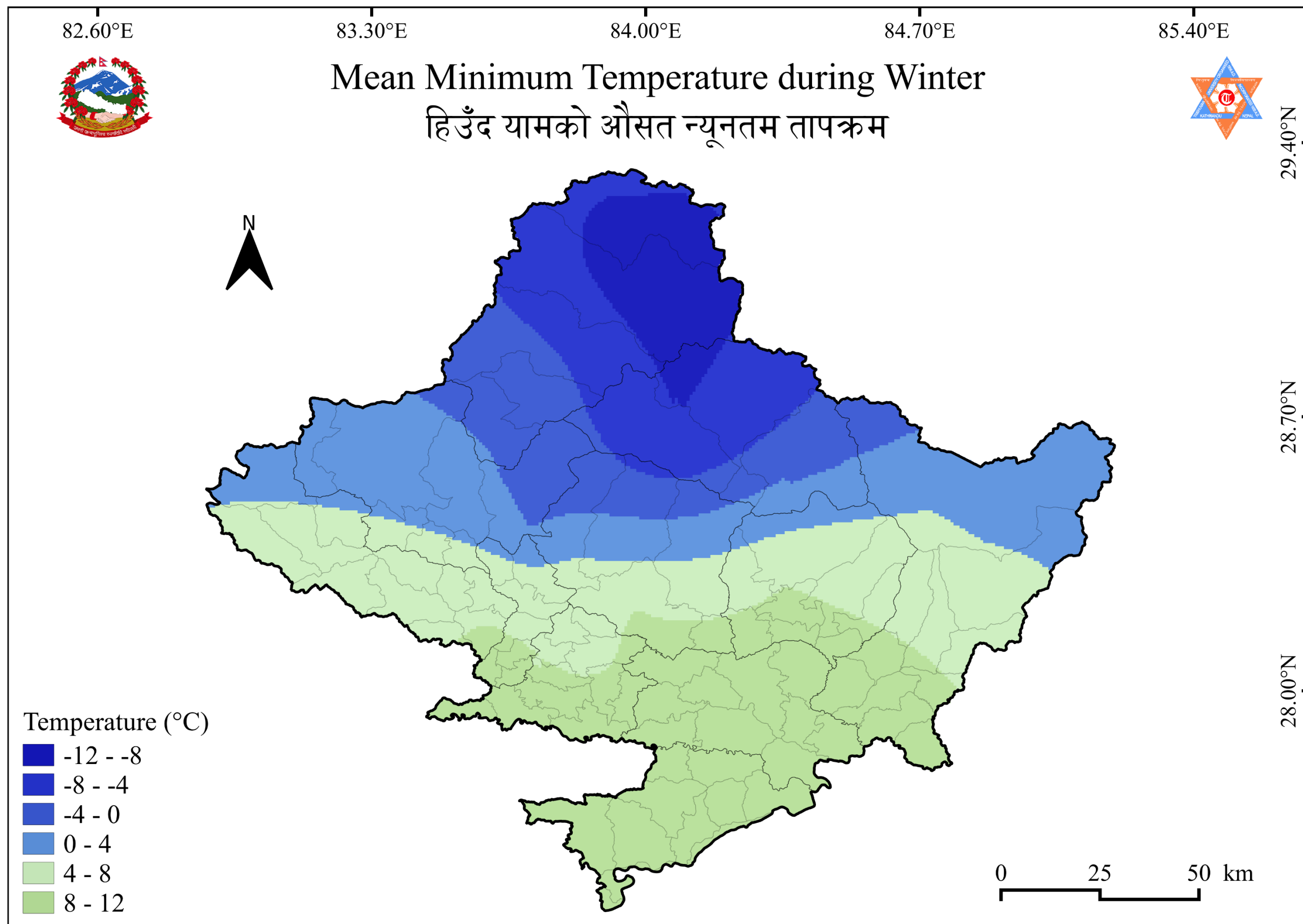


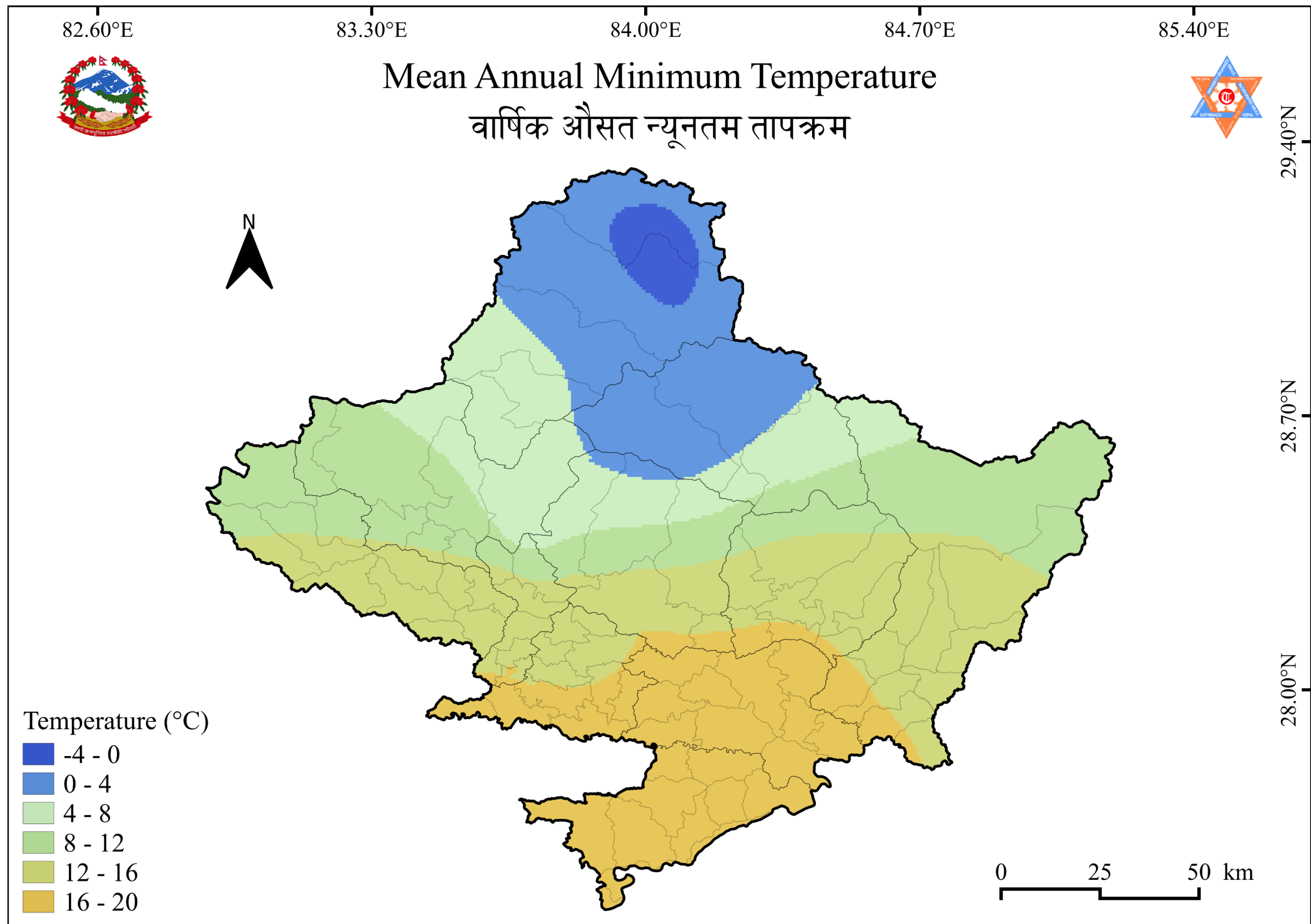


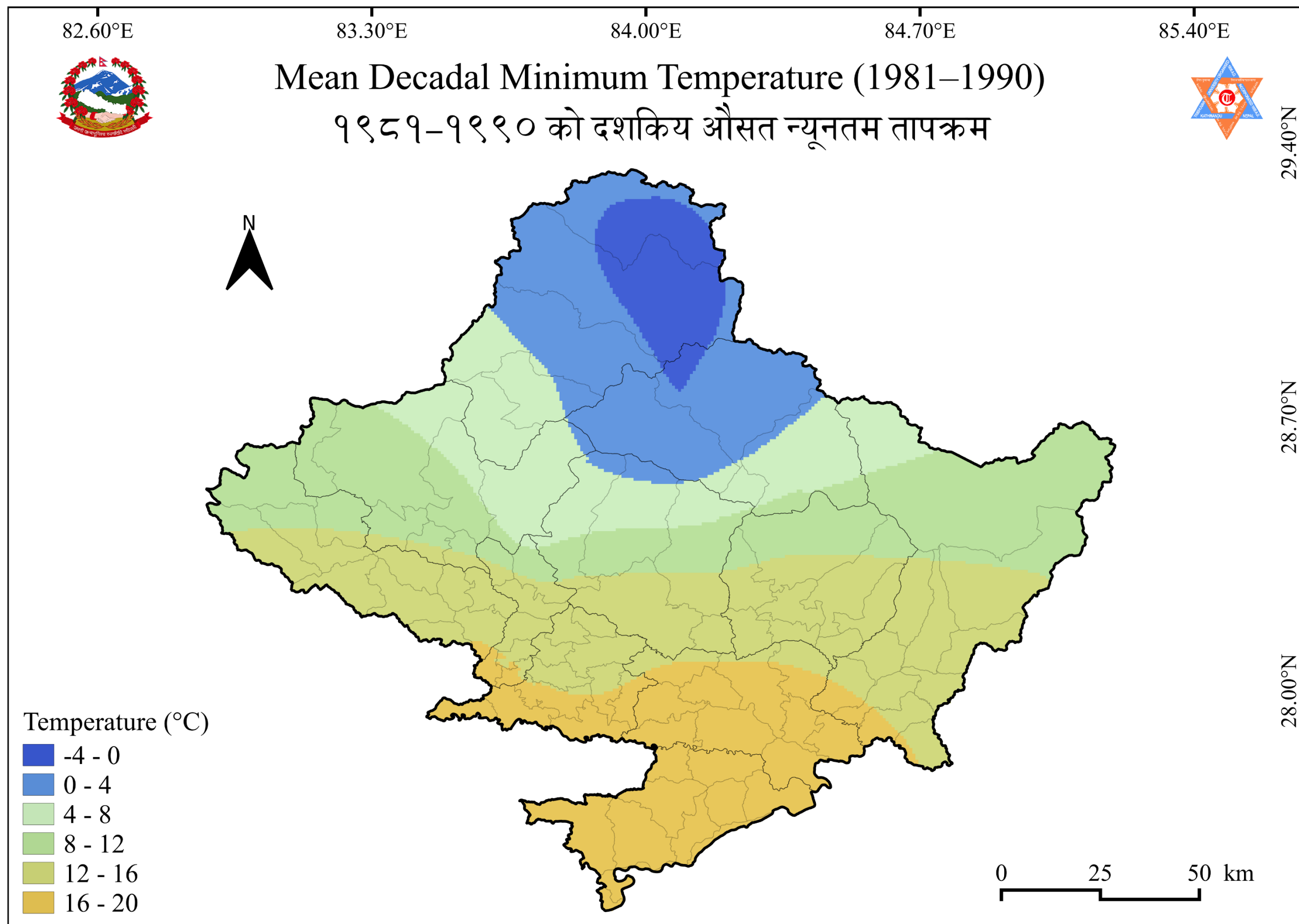


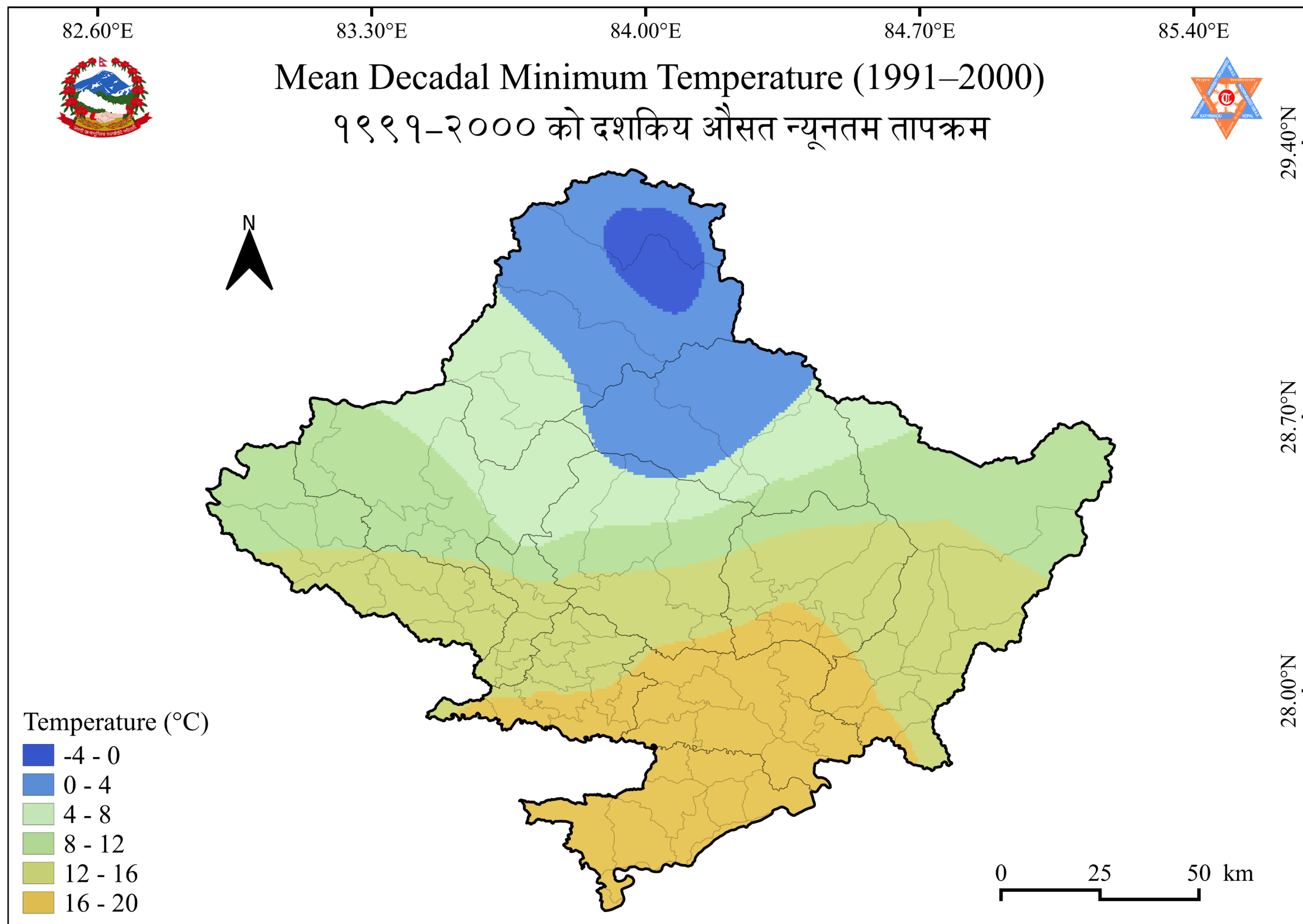


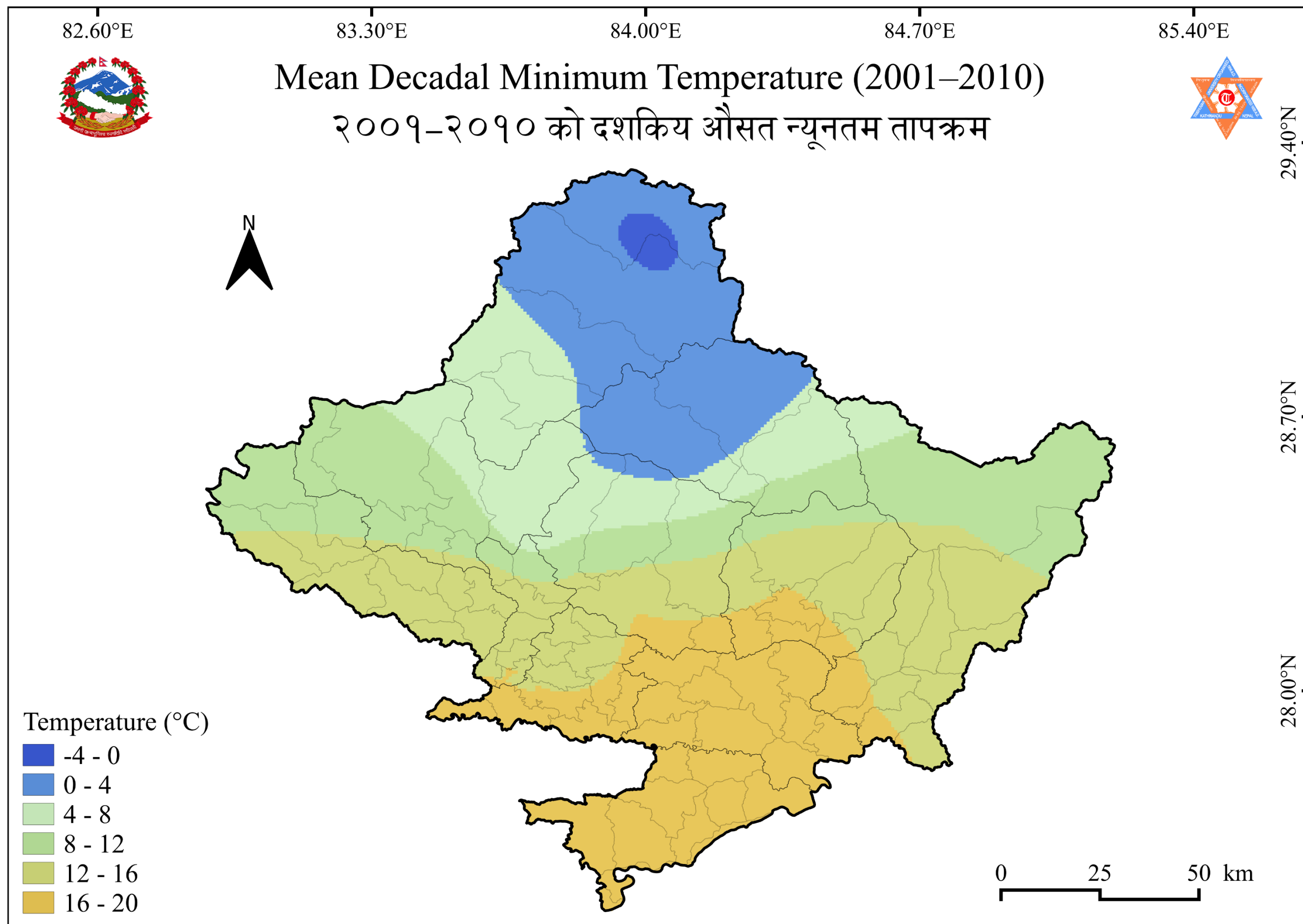












82.60°E

83.30°E

84.00°E

84.70°E

85.40°E



Mean Decadal Minimum Temperature (2011–2020)

२०११-२०२० को दशकिय औसत न्यूनतम तापक्रम



29.40°N



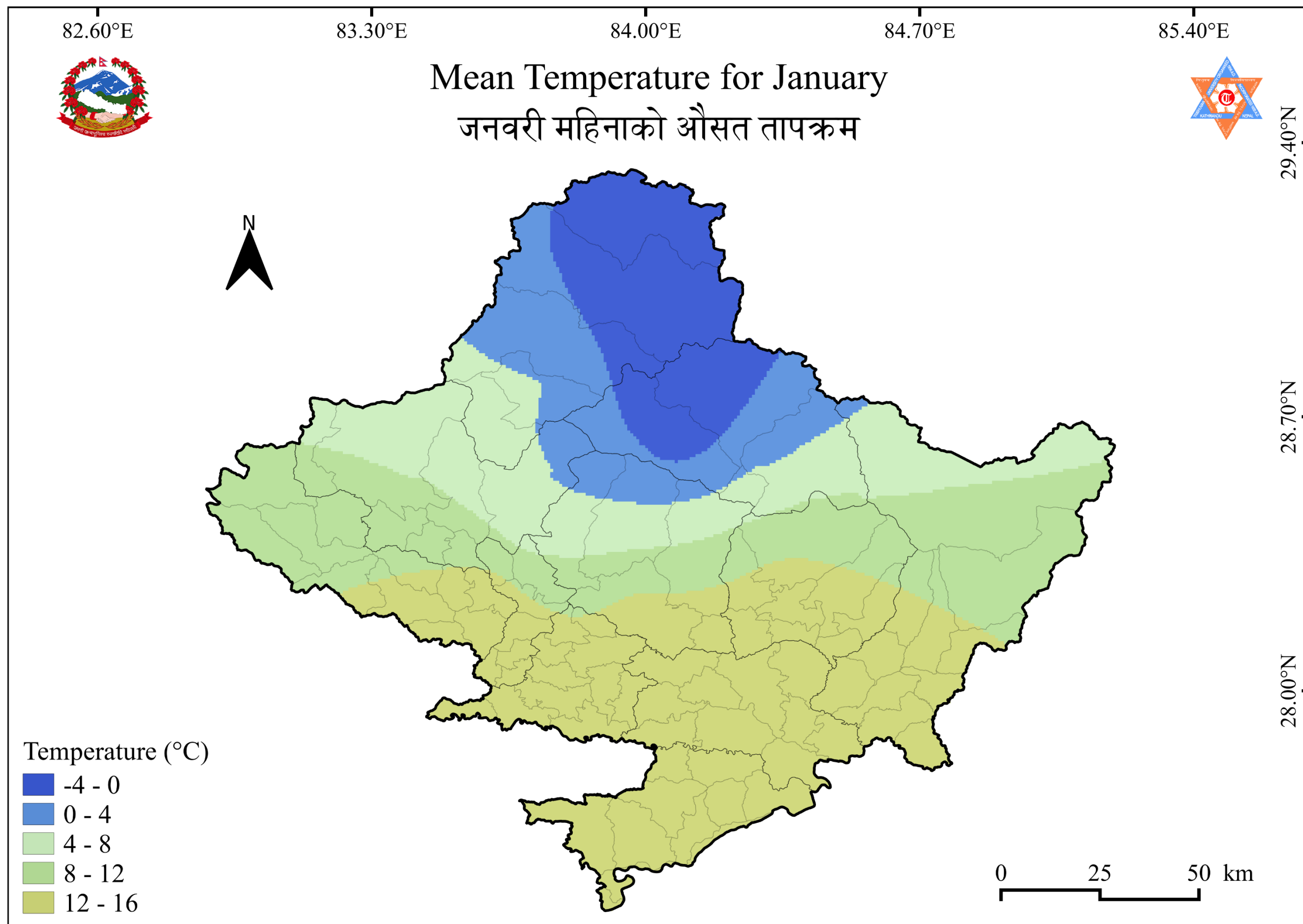
28.70°N

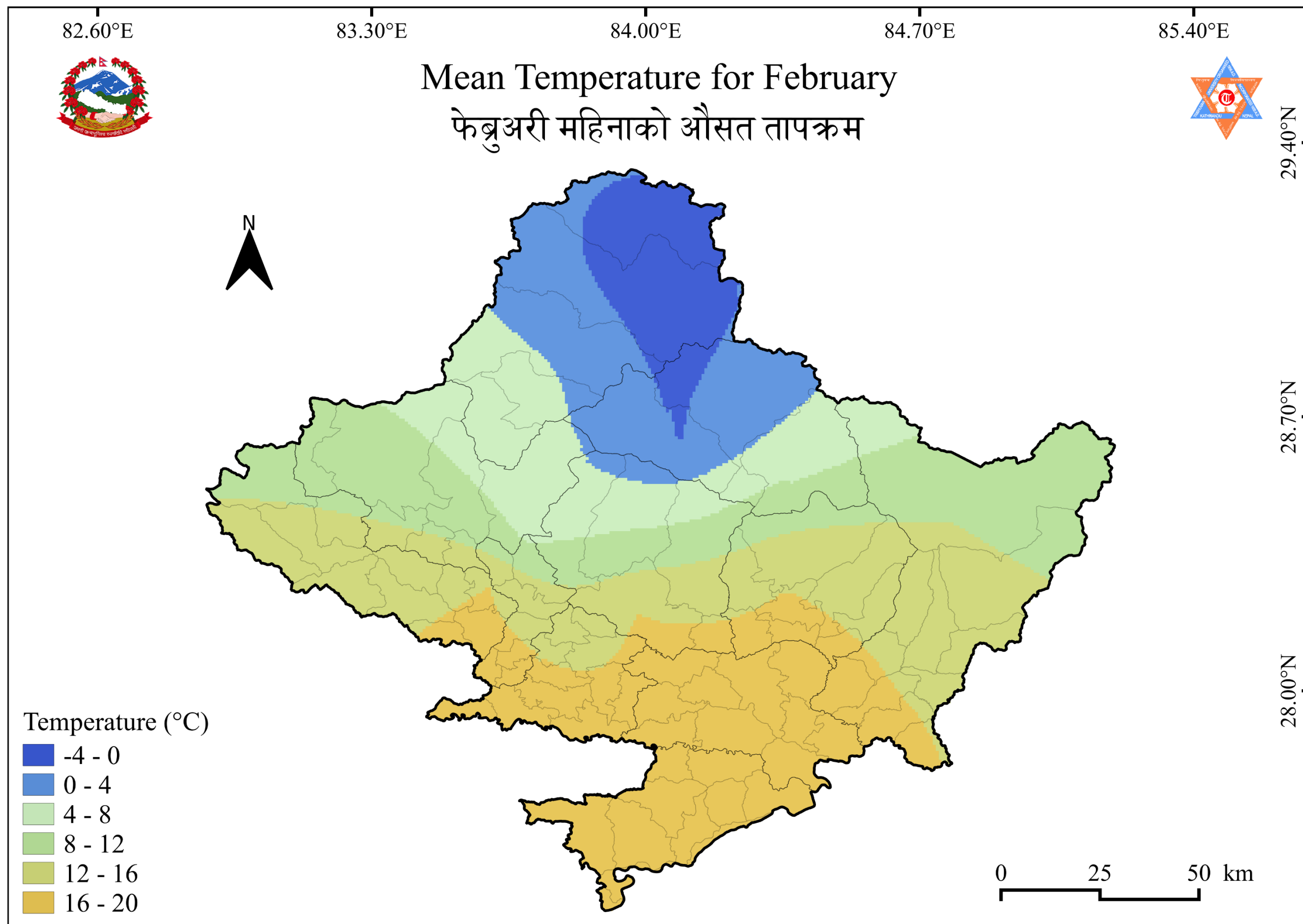
28.00°N

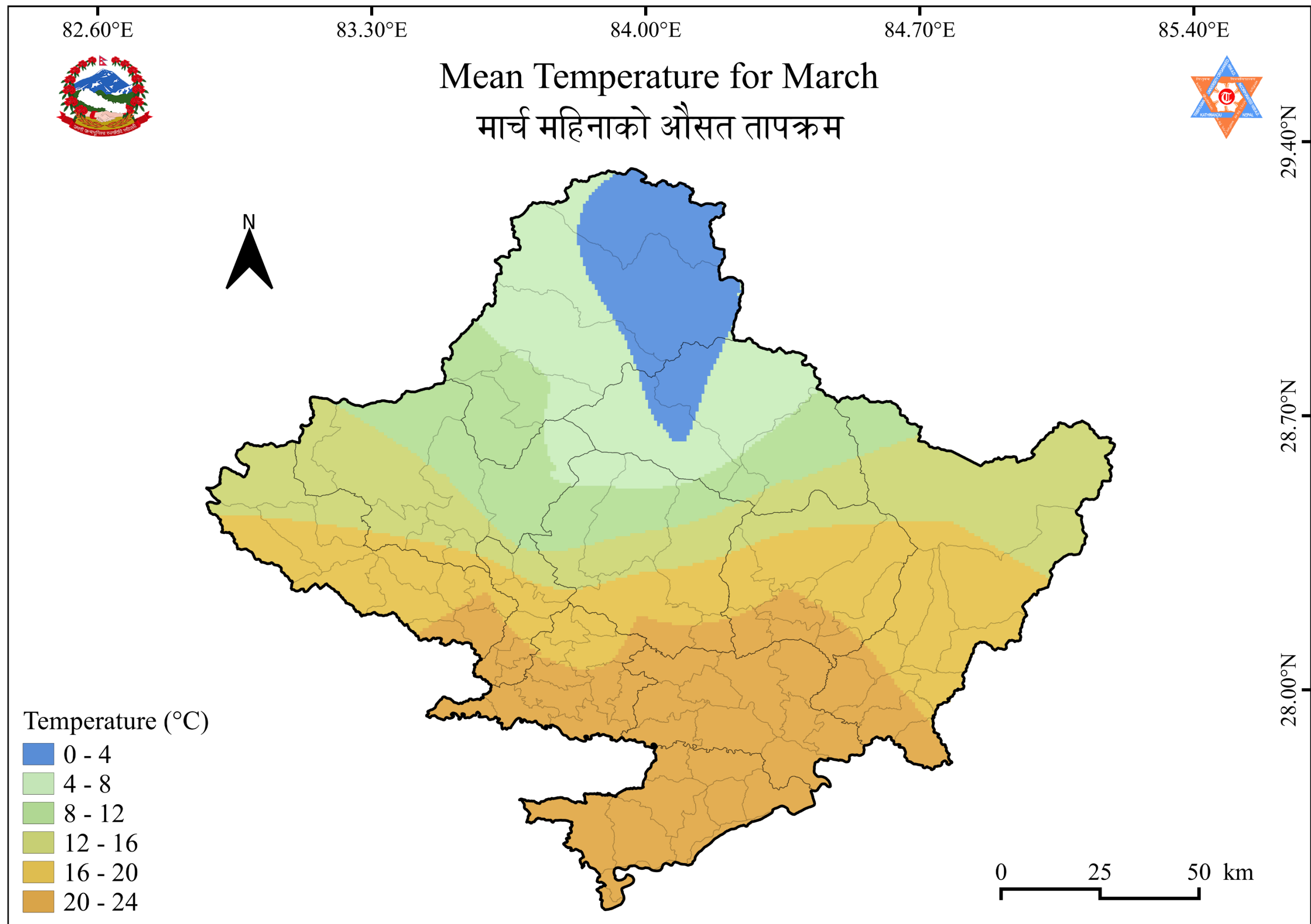
Temperature (°C)

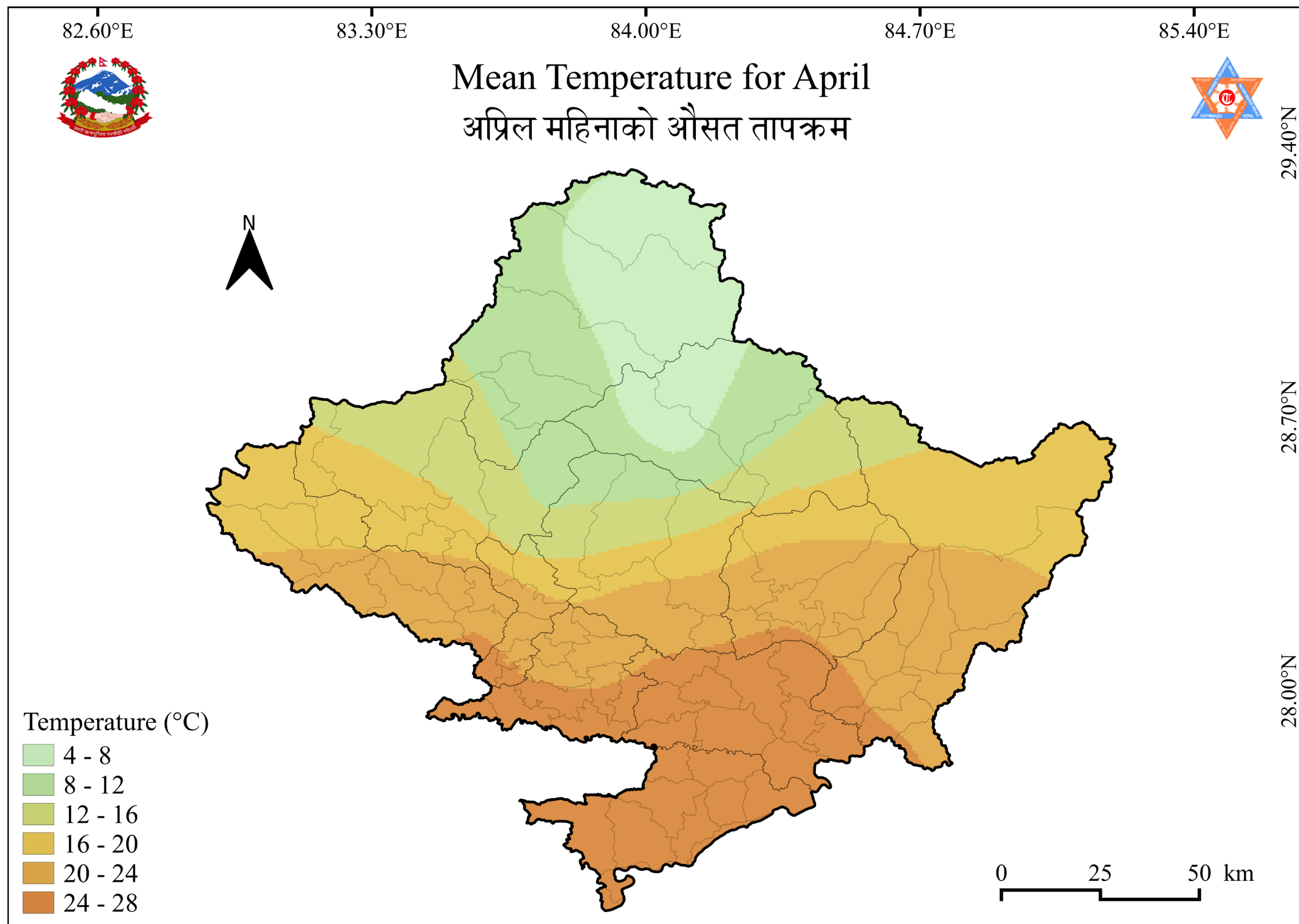
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- 0 - 4
- 4 - 8
- 8 - 12
- 12 - 16
- 16 - 20

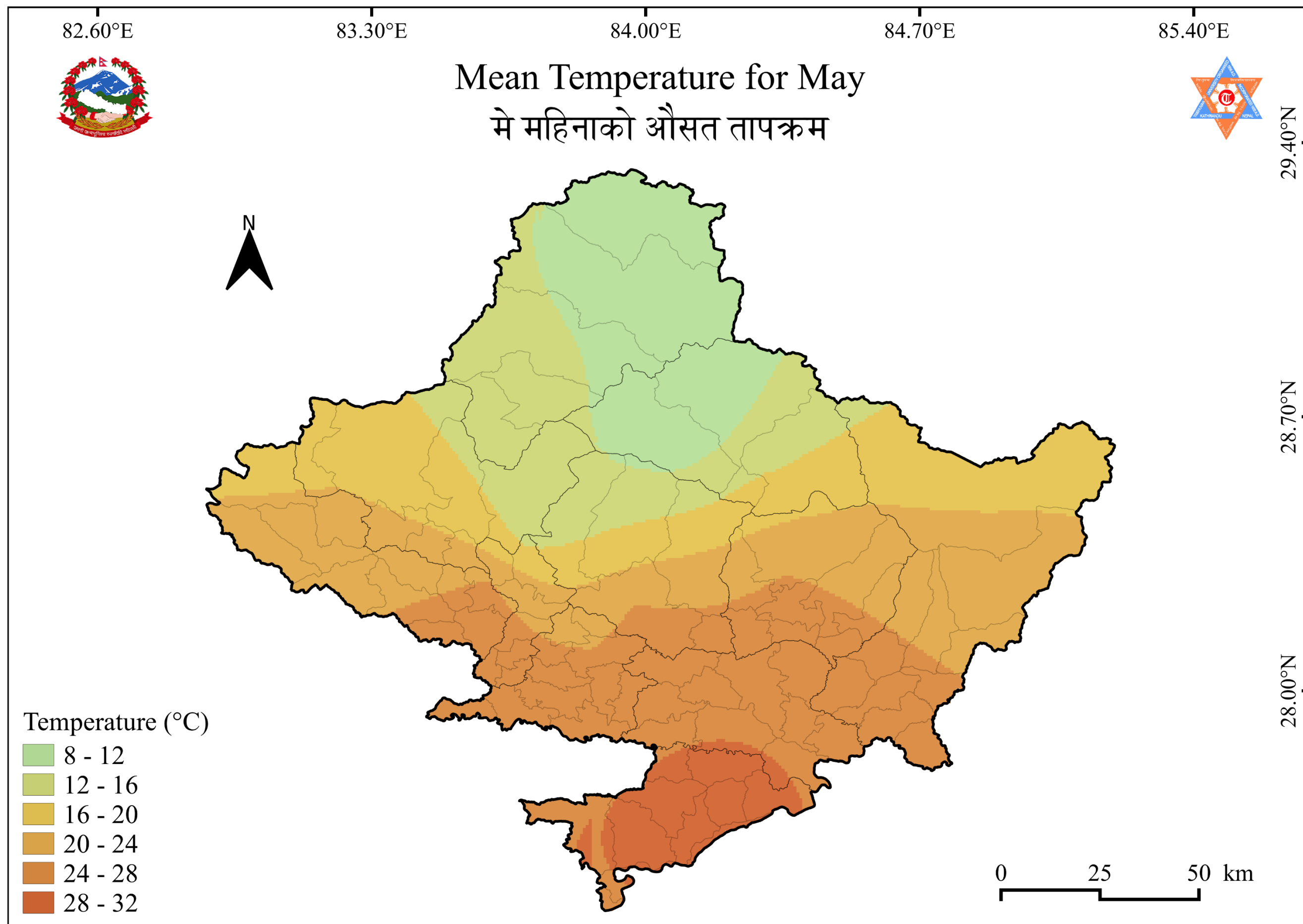
0 25 50 km

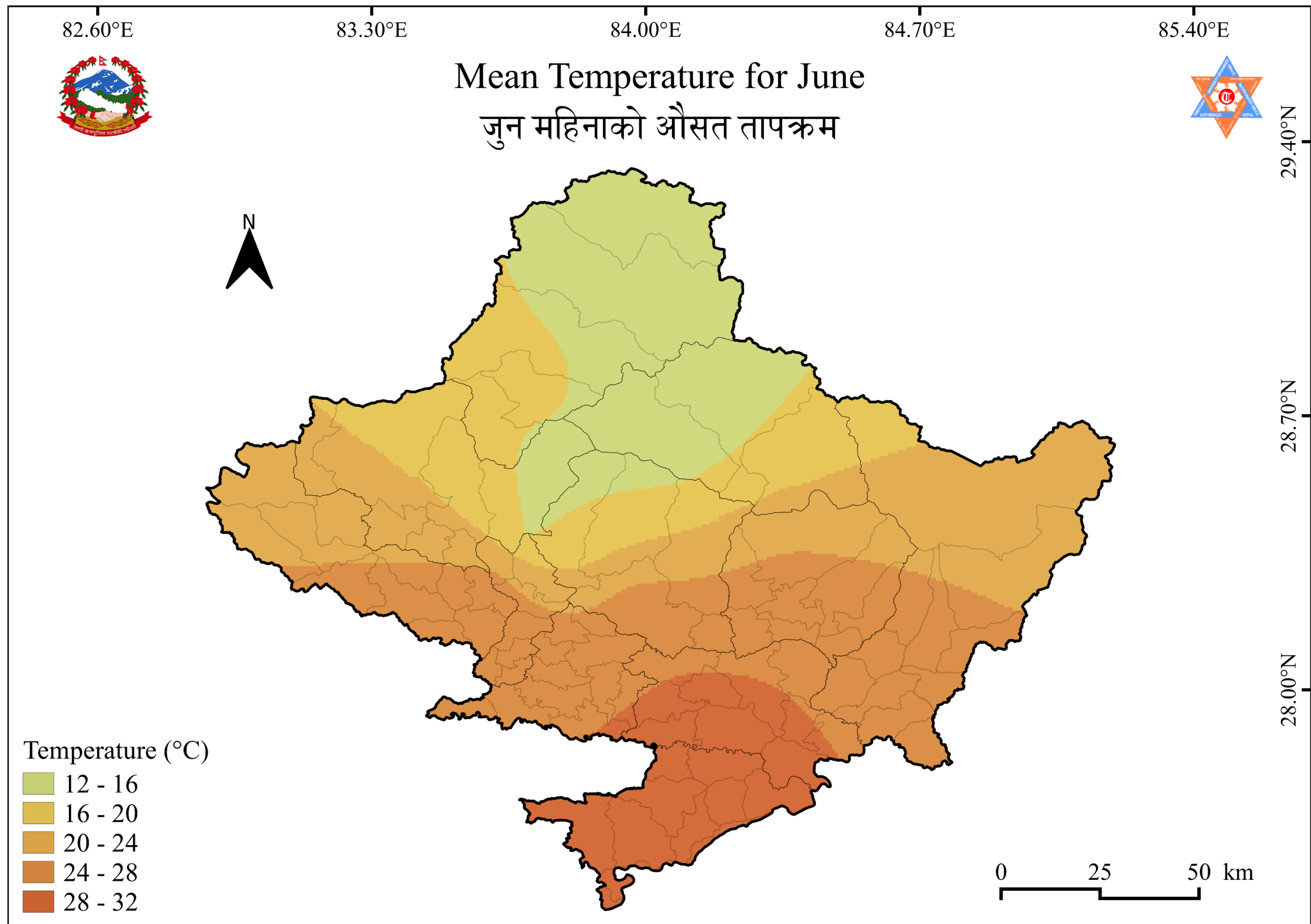


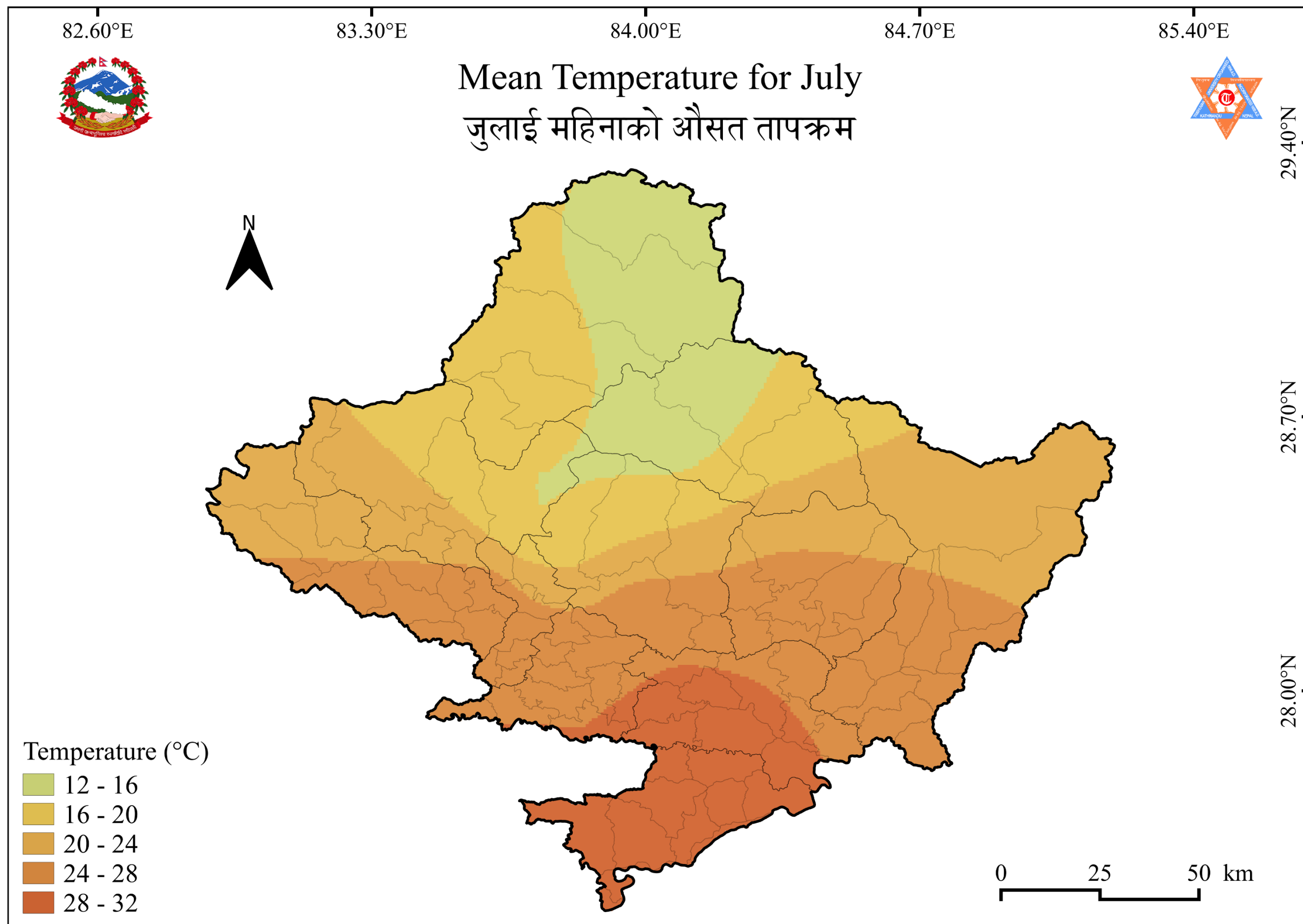


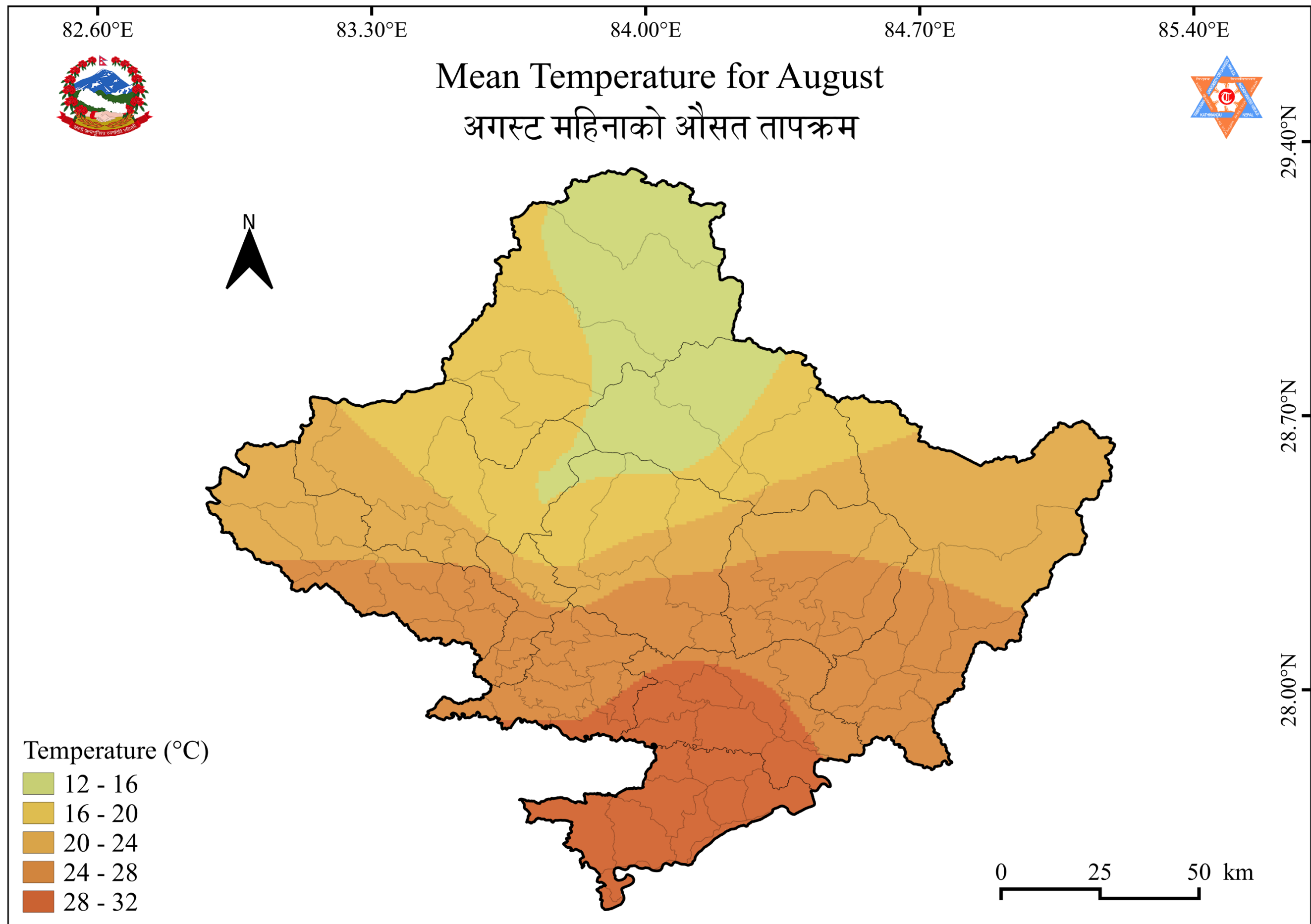


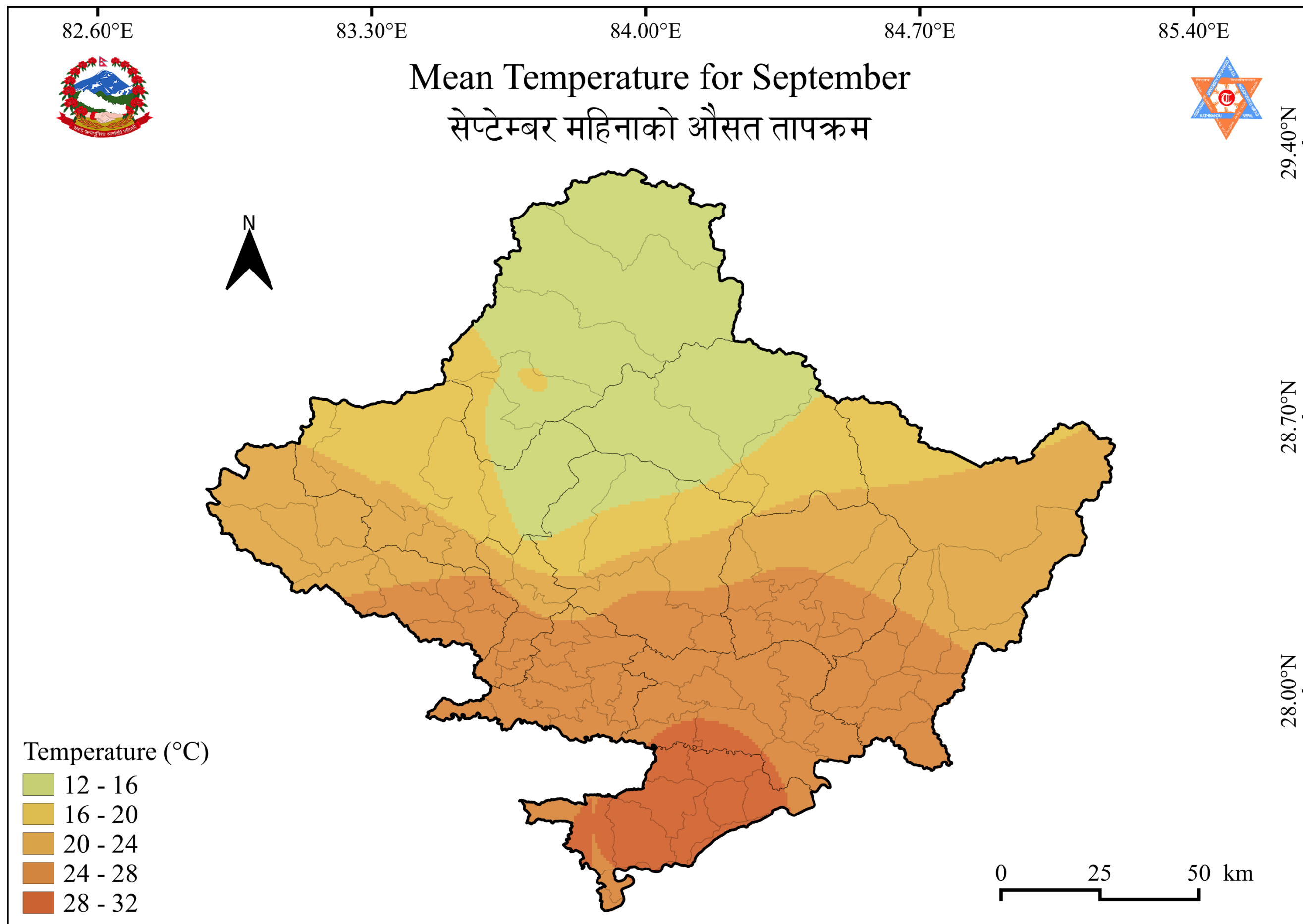


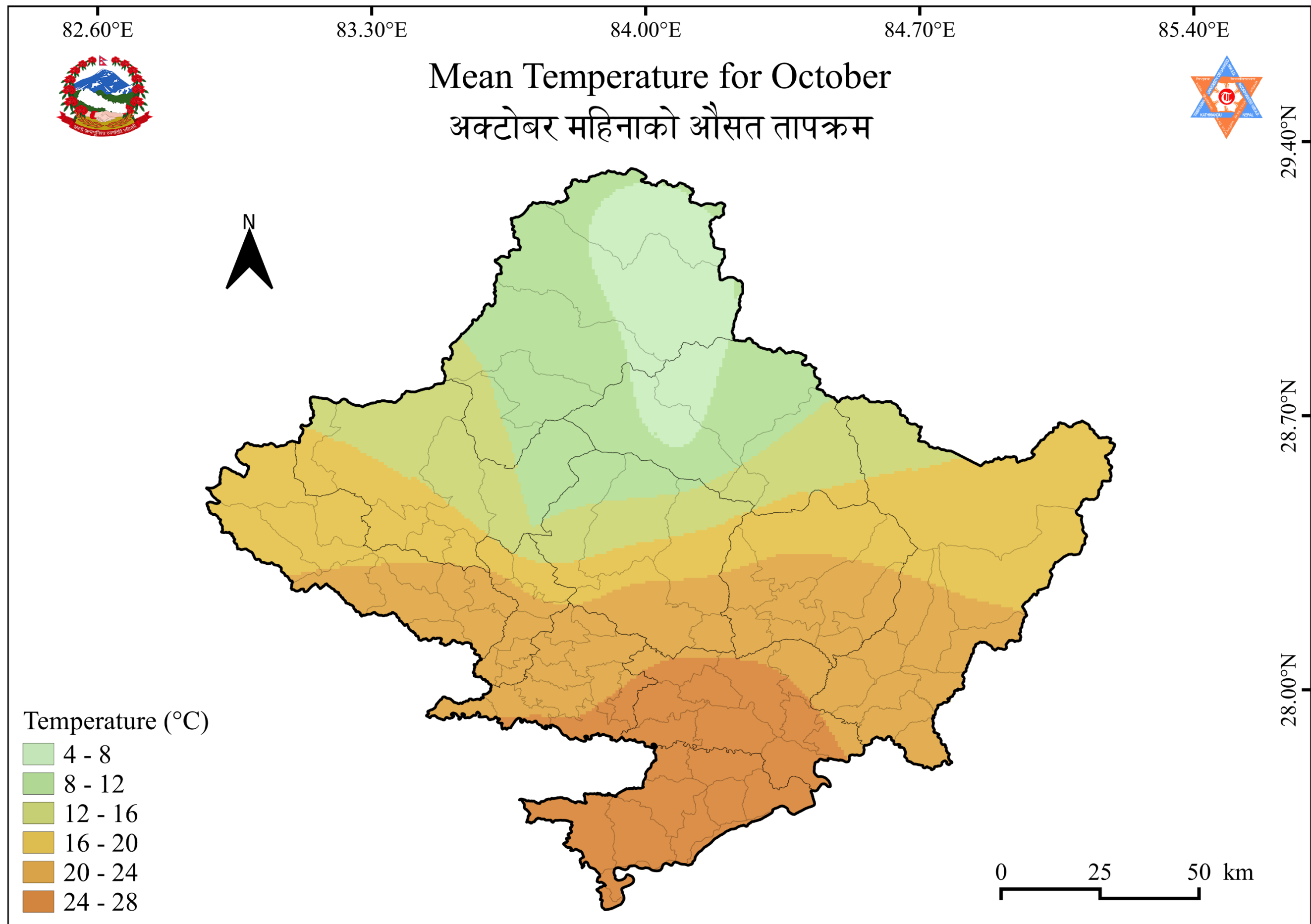


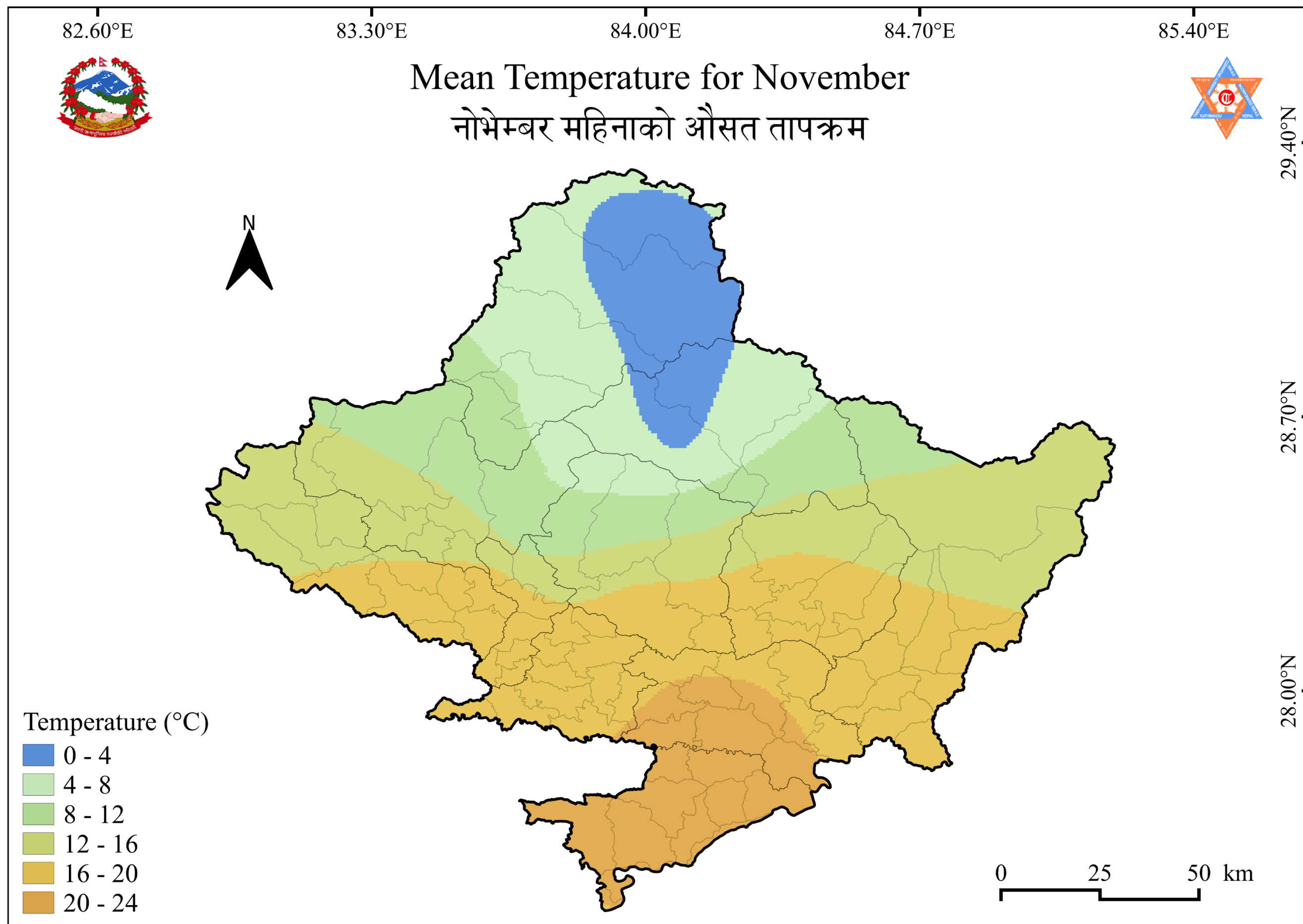


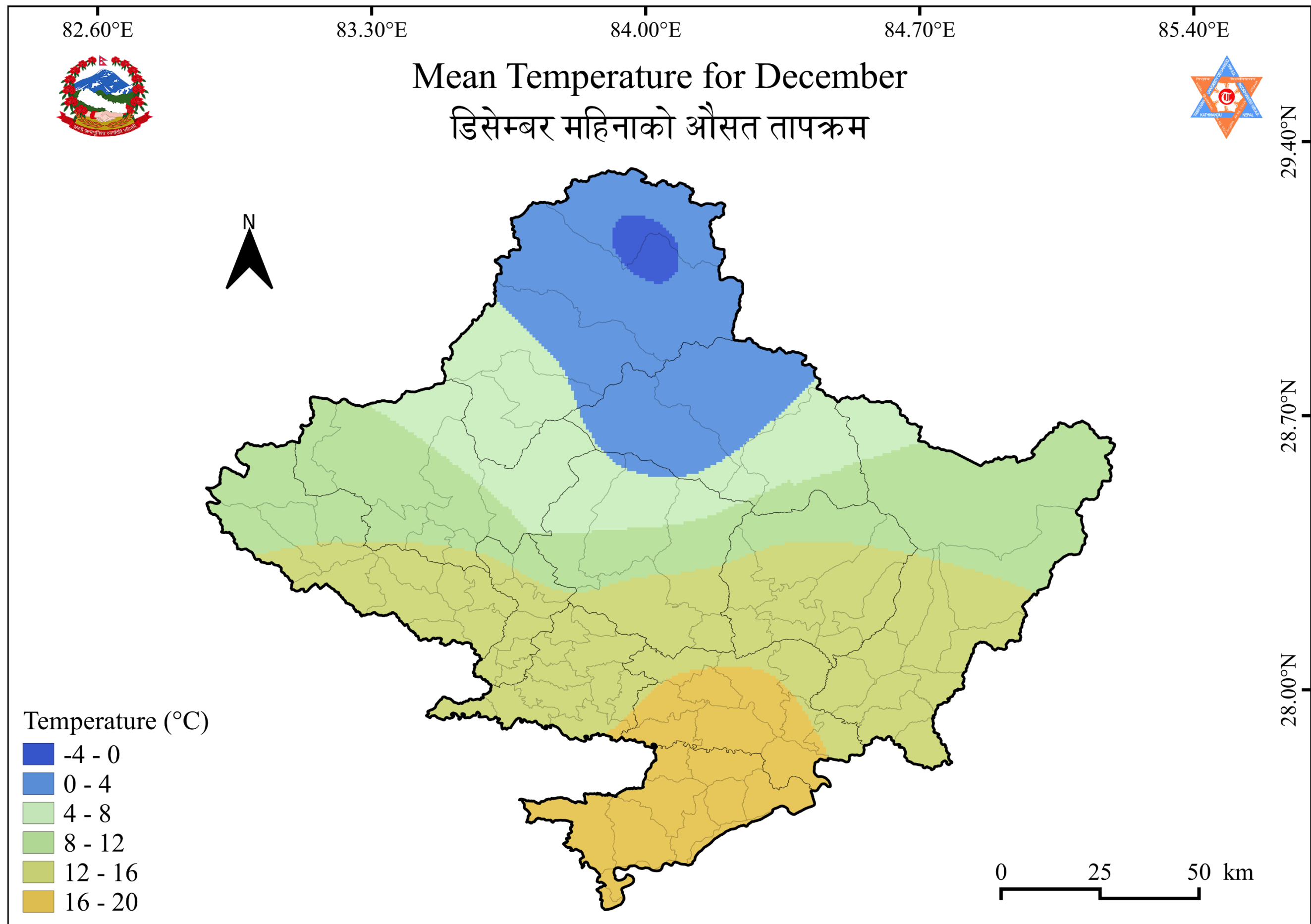


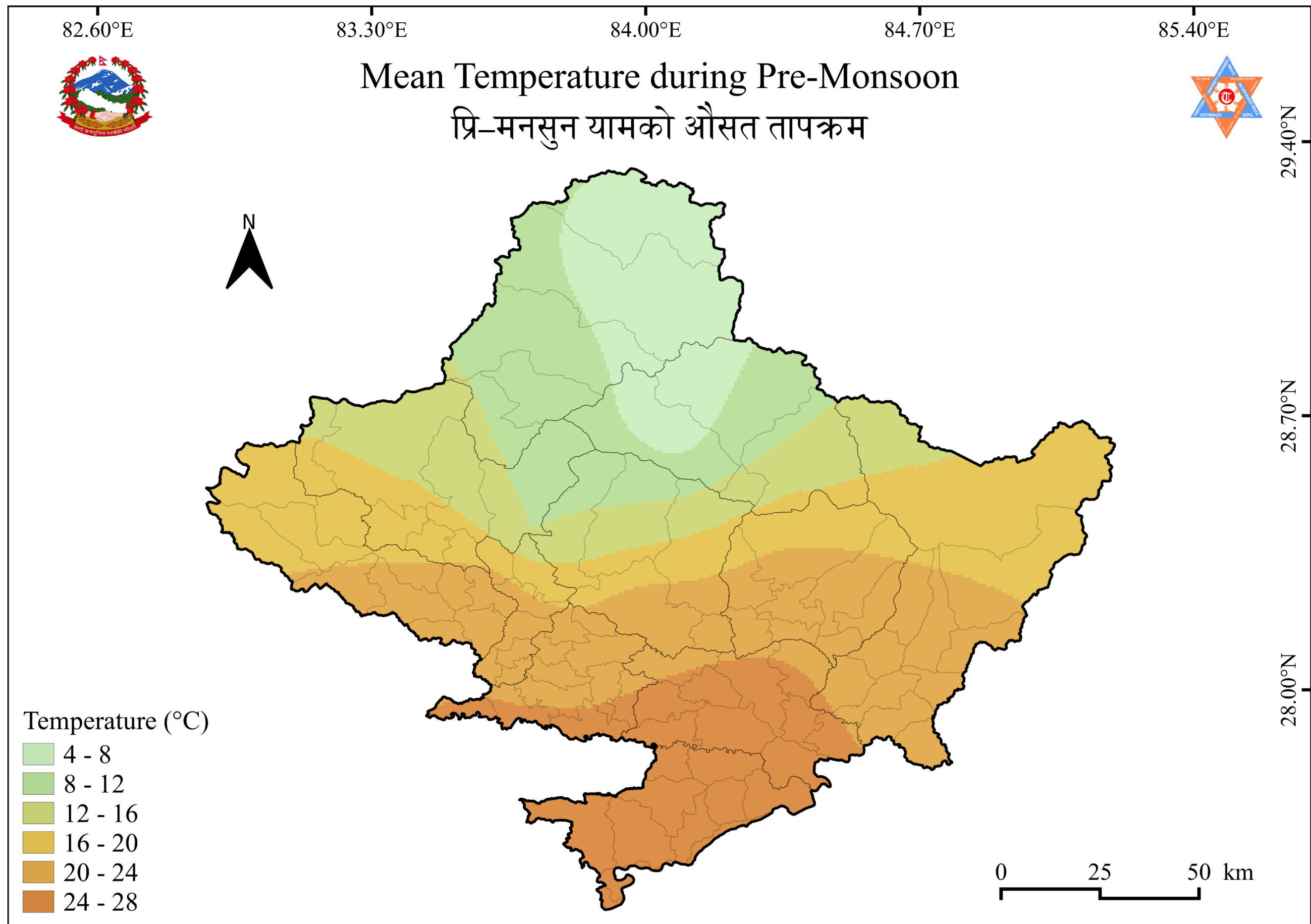


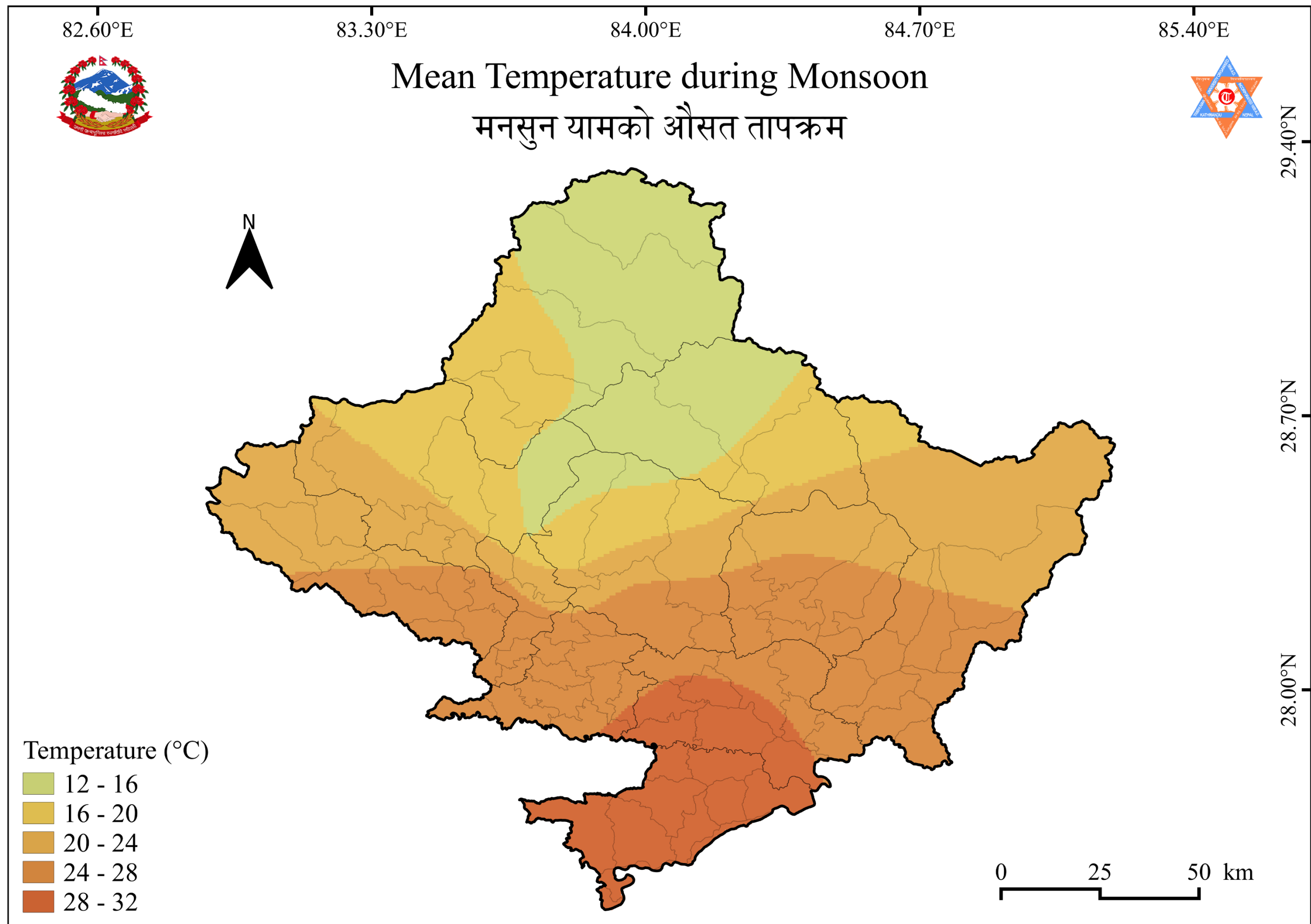


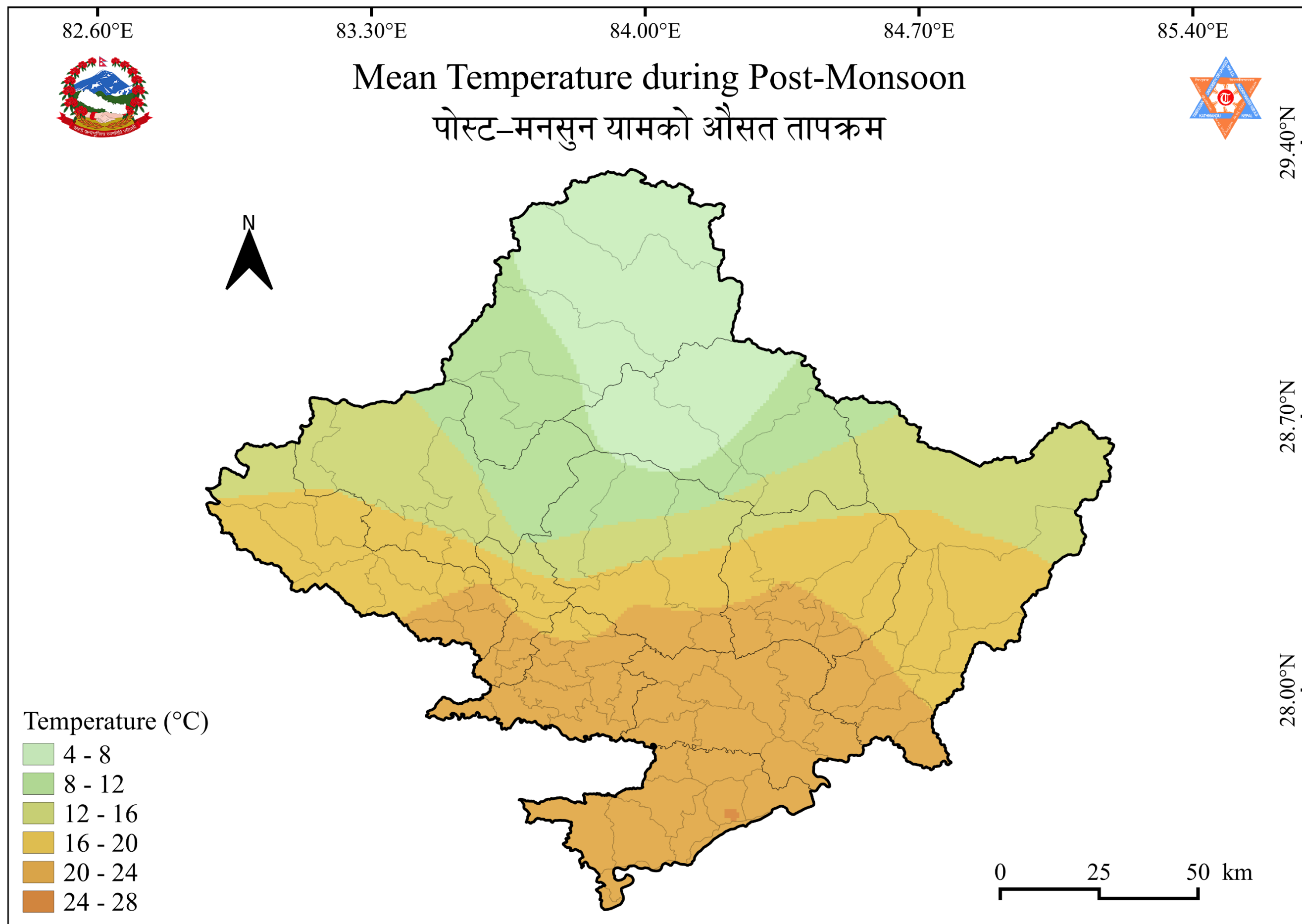


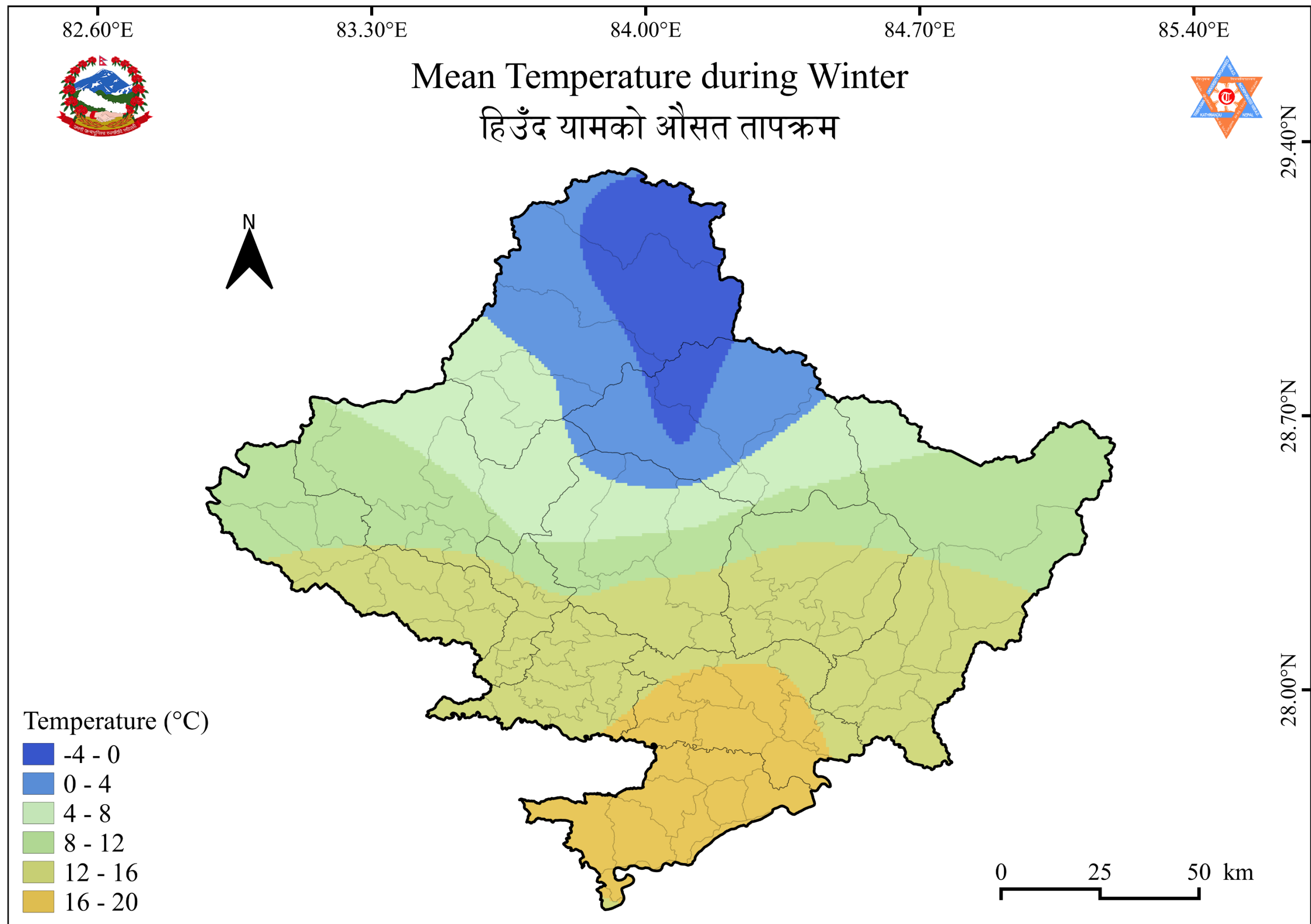


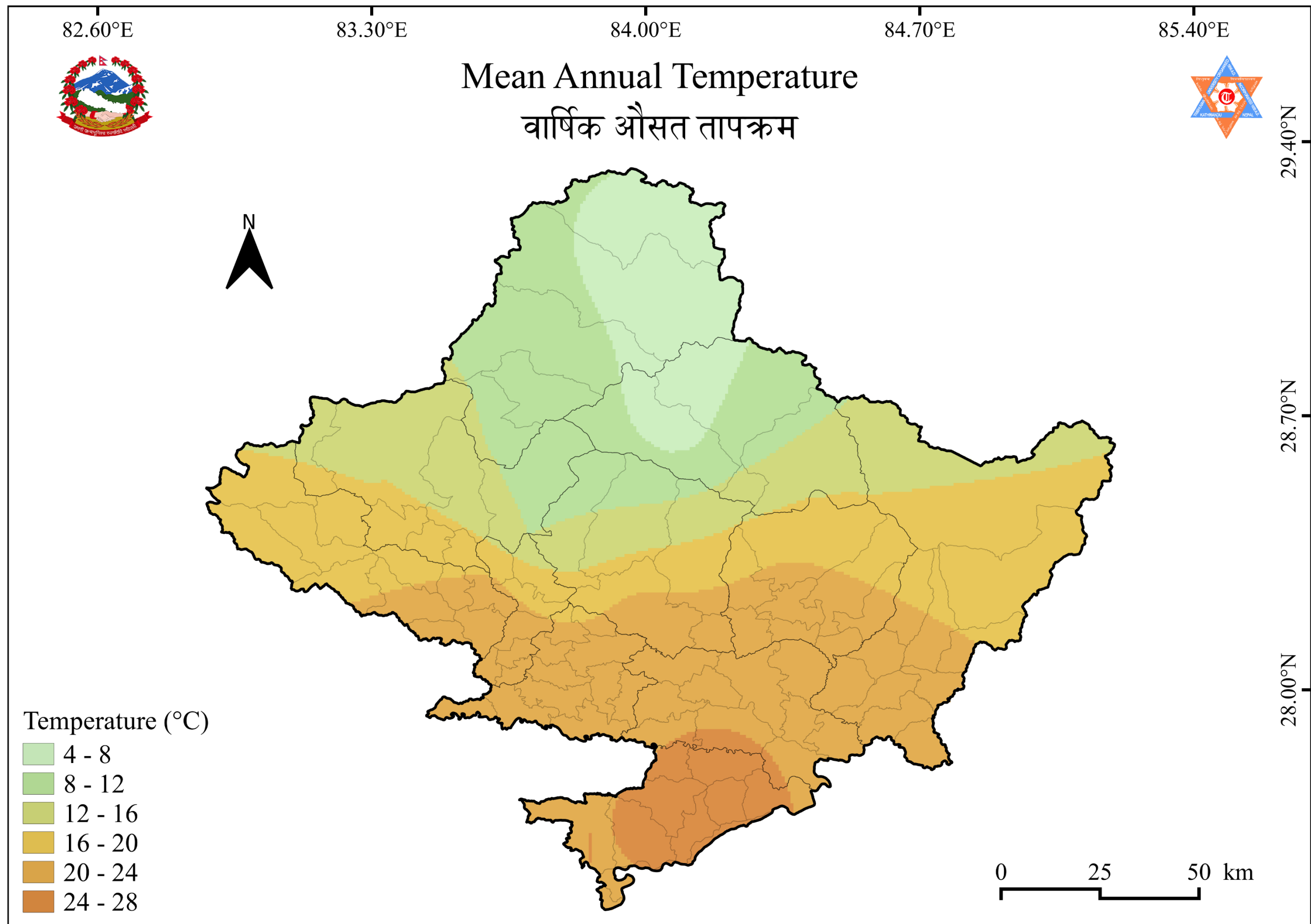


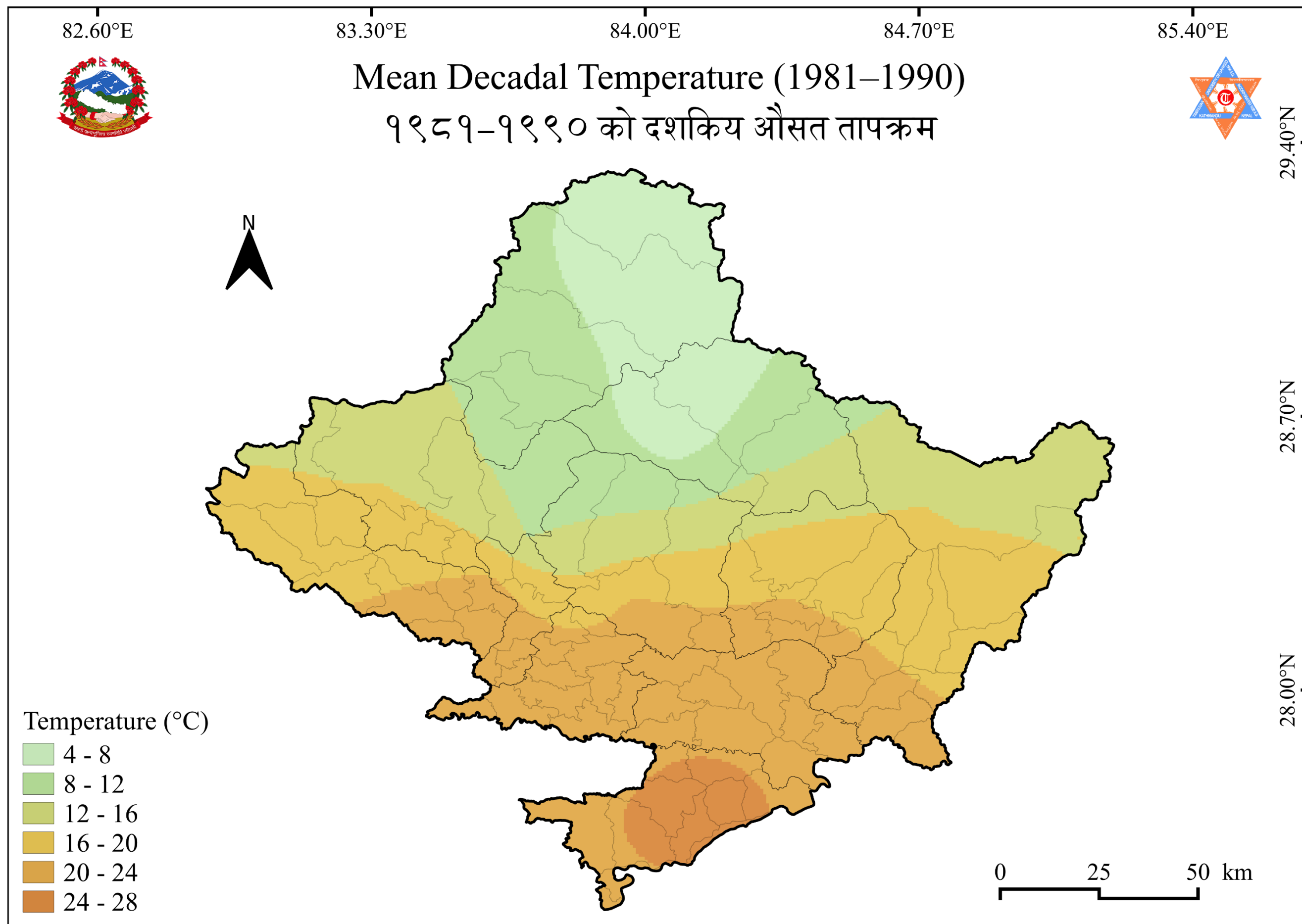


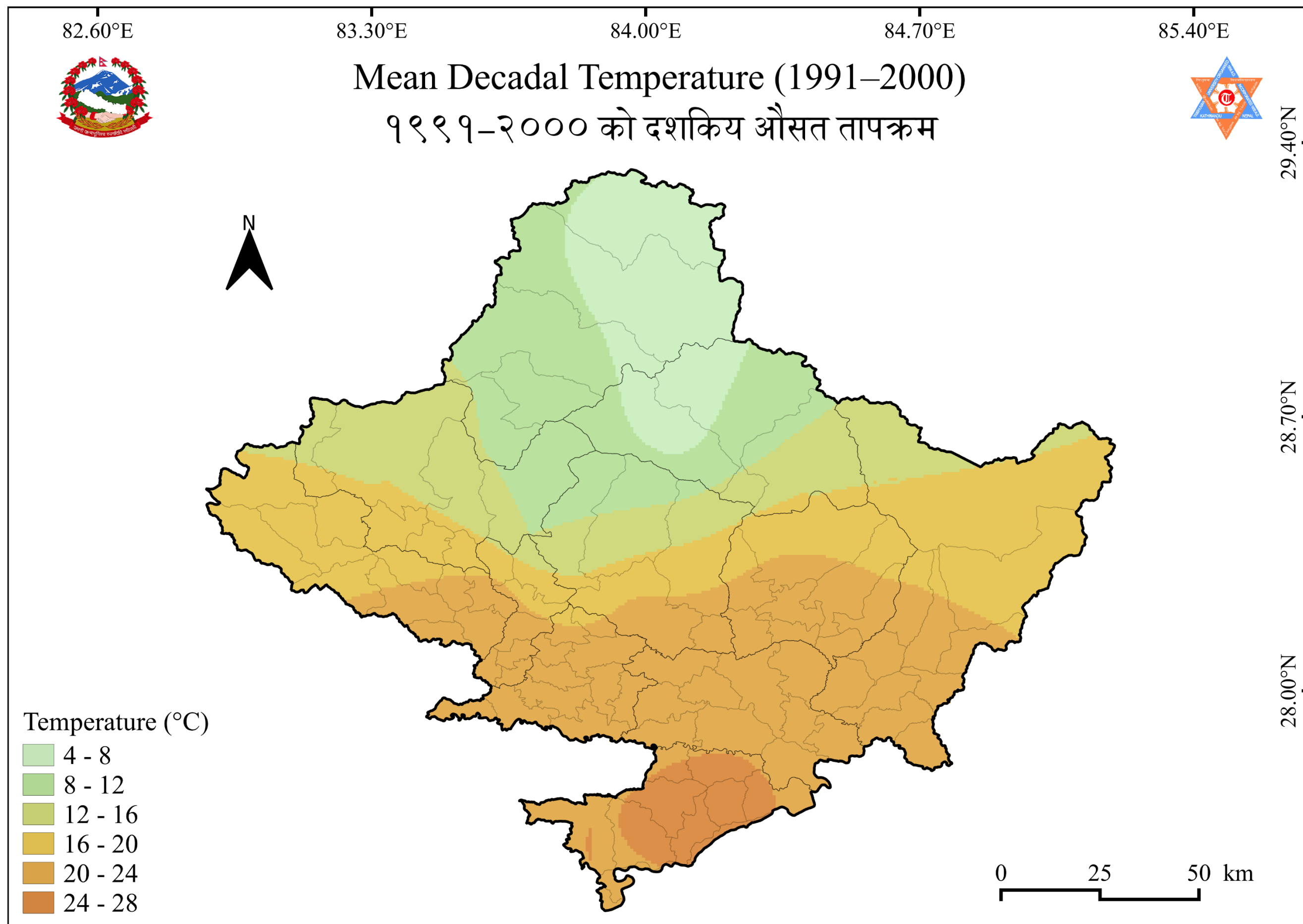


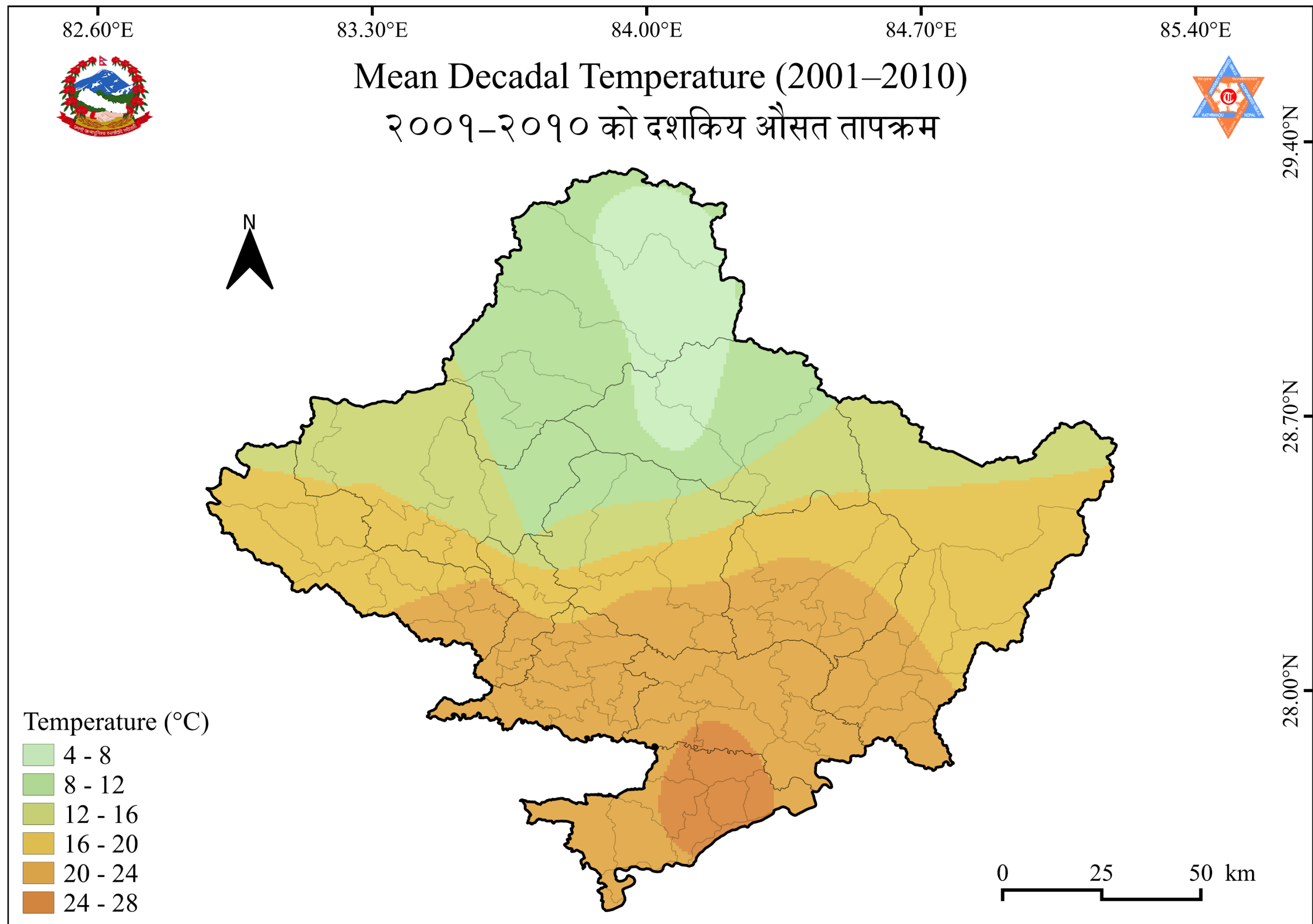


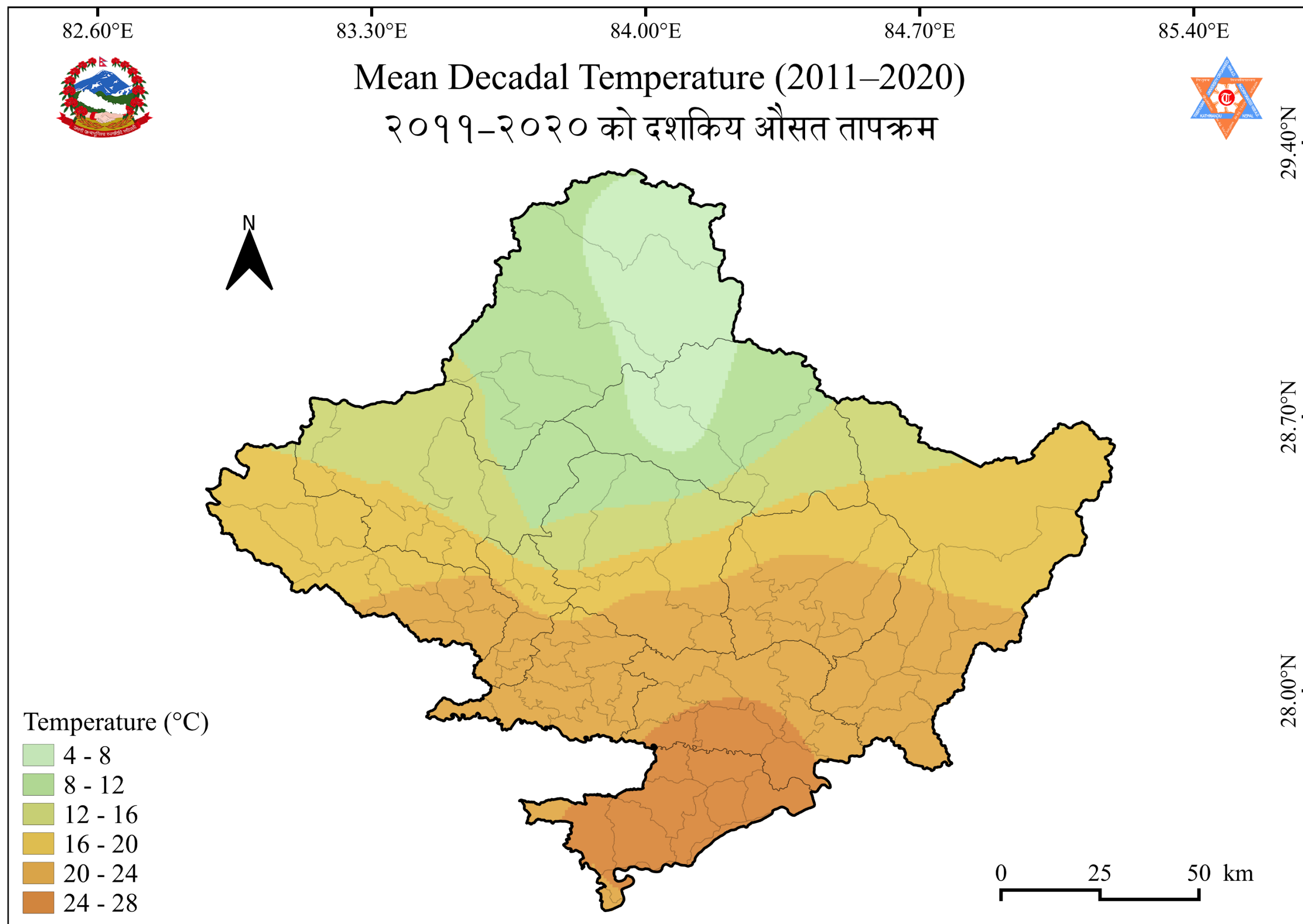


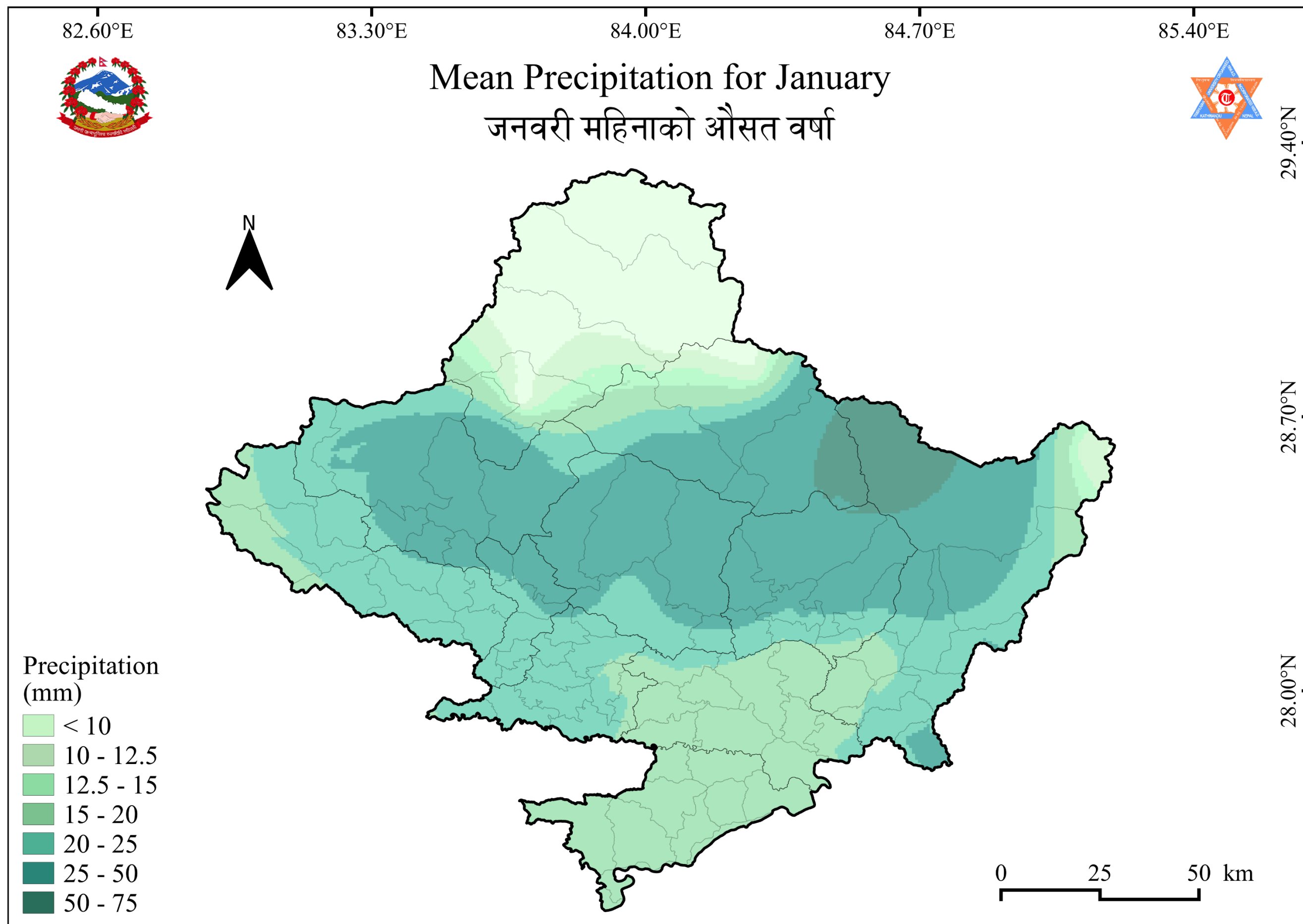


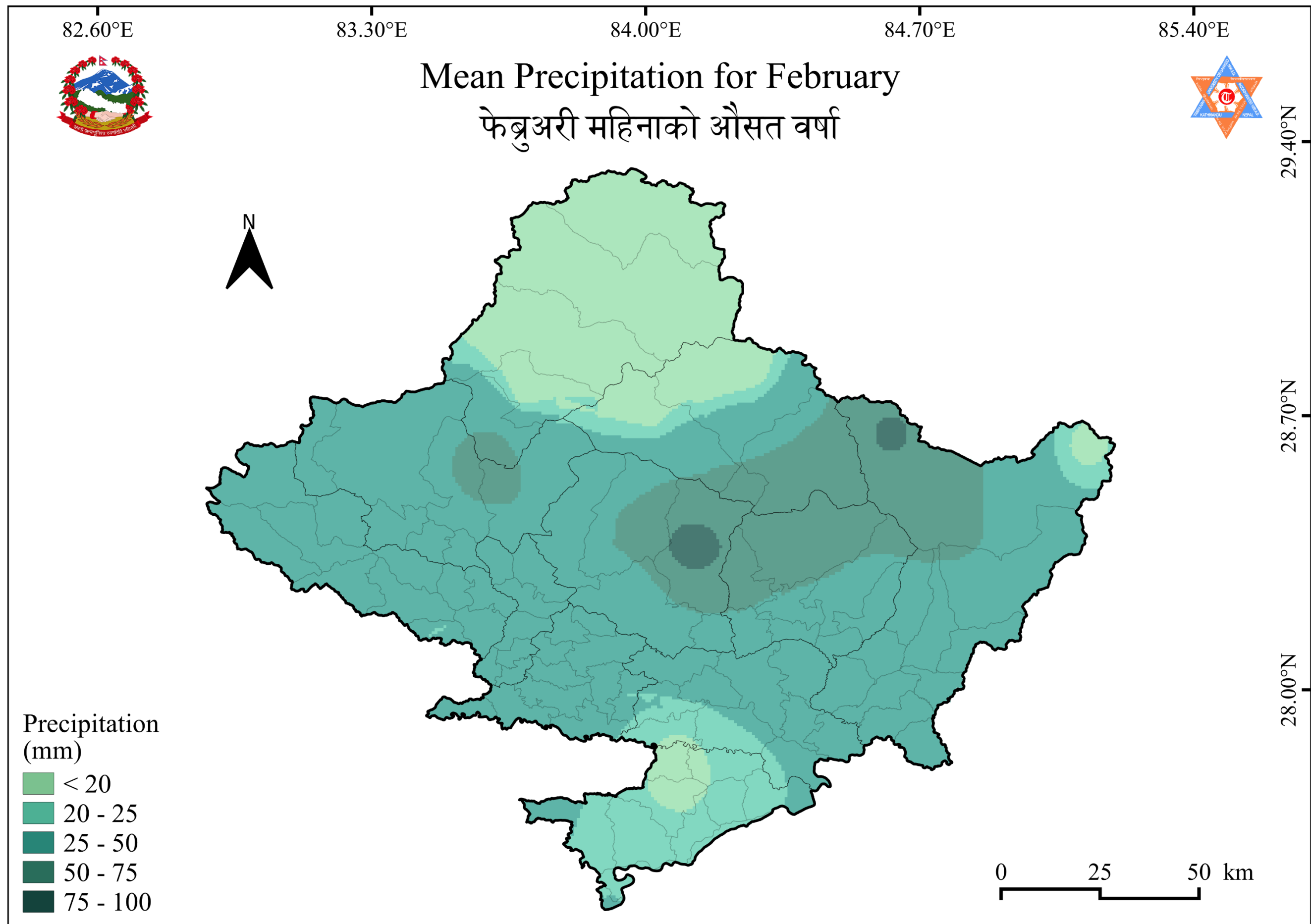


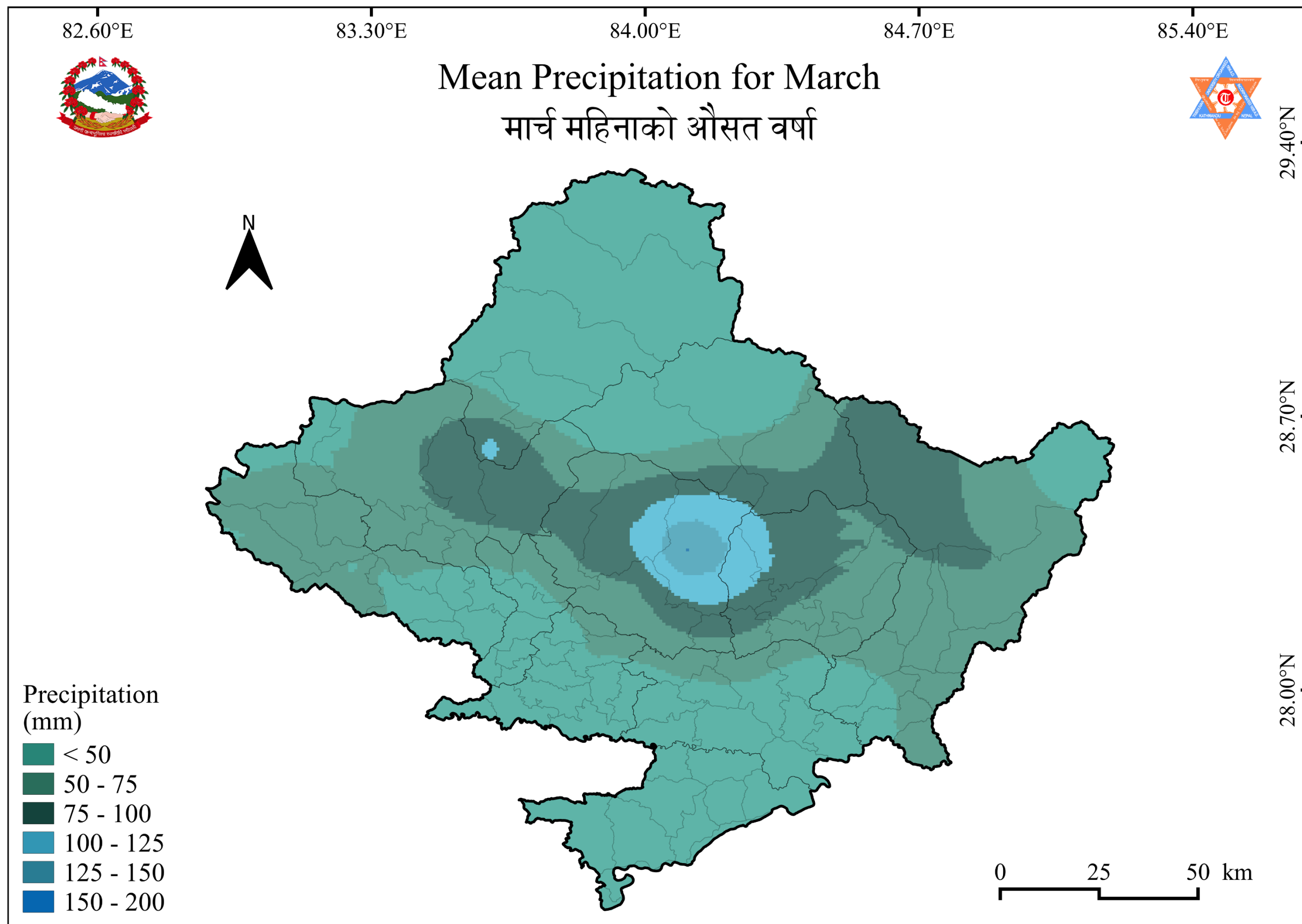


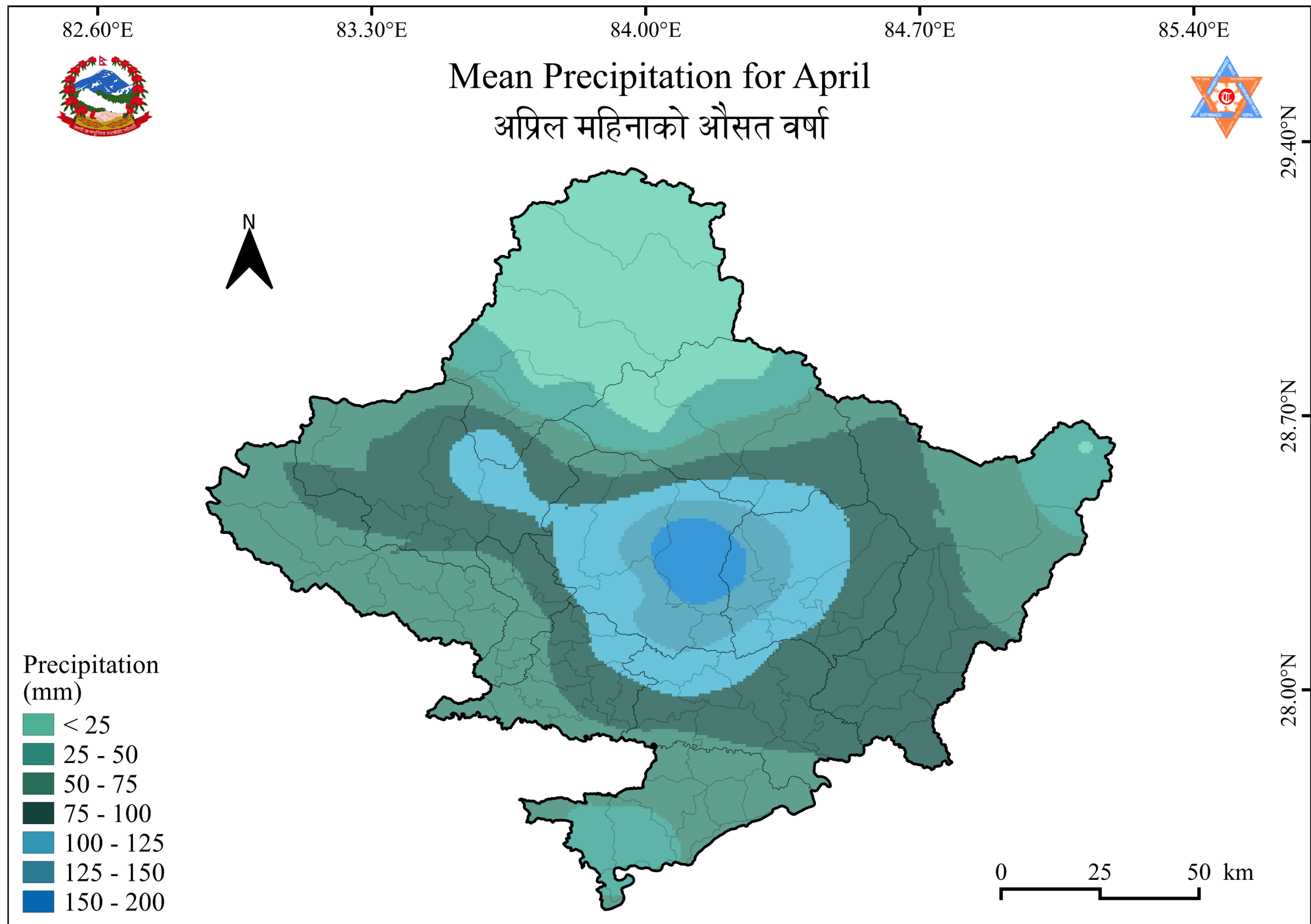


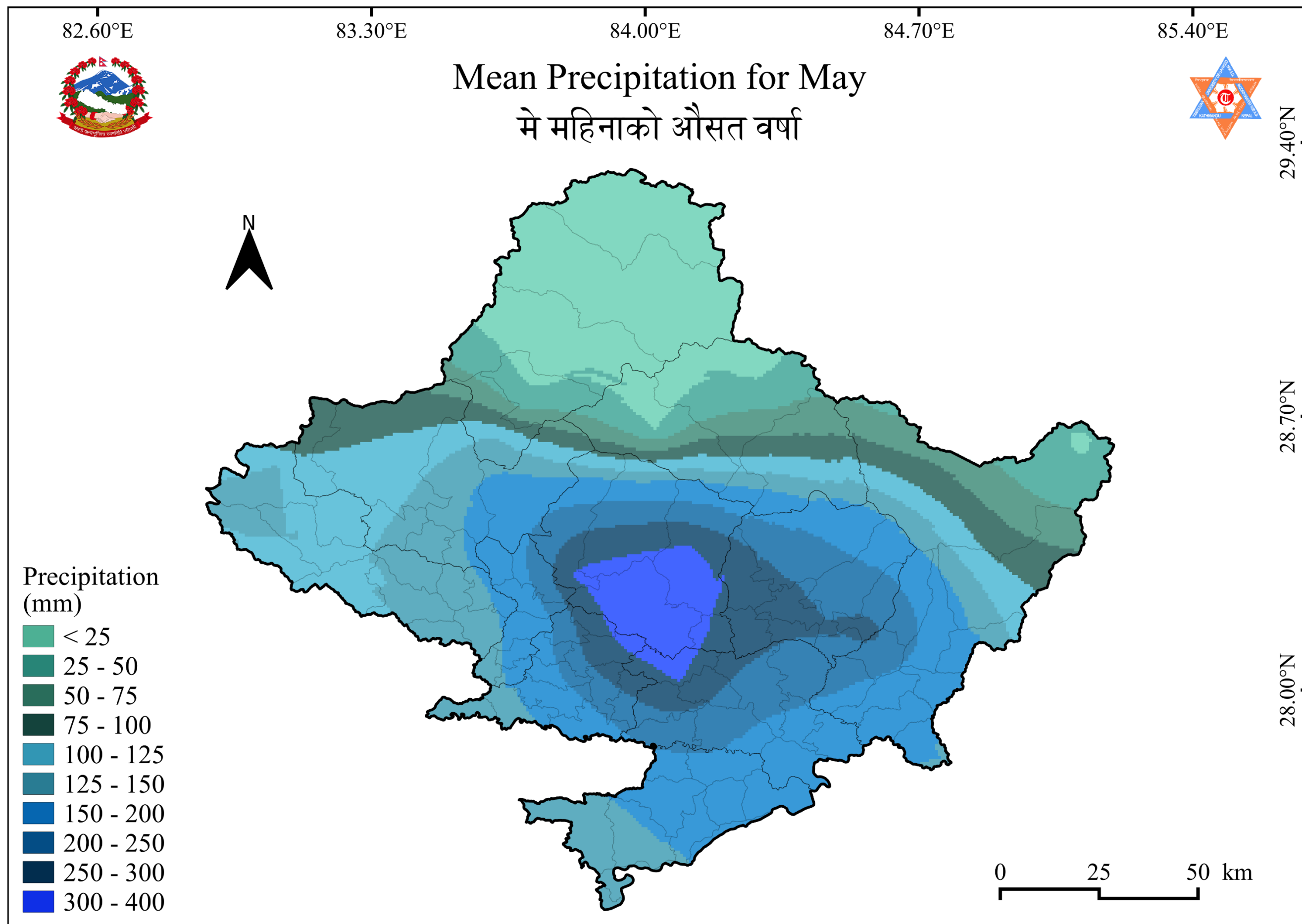


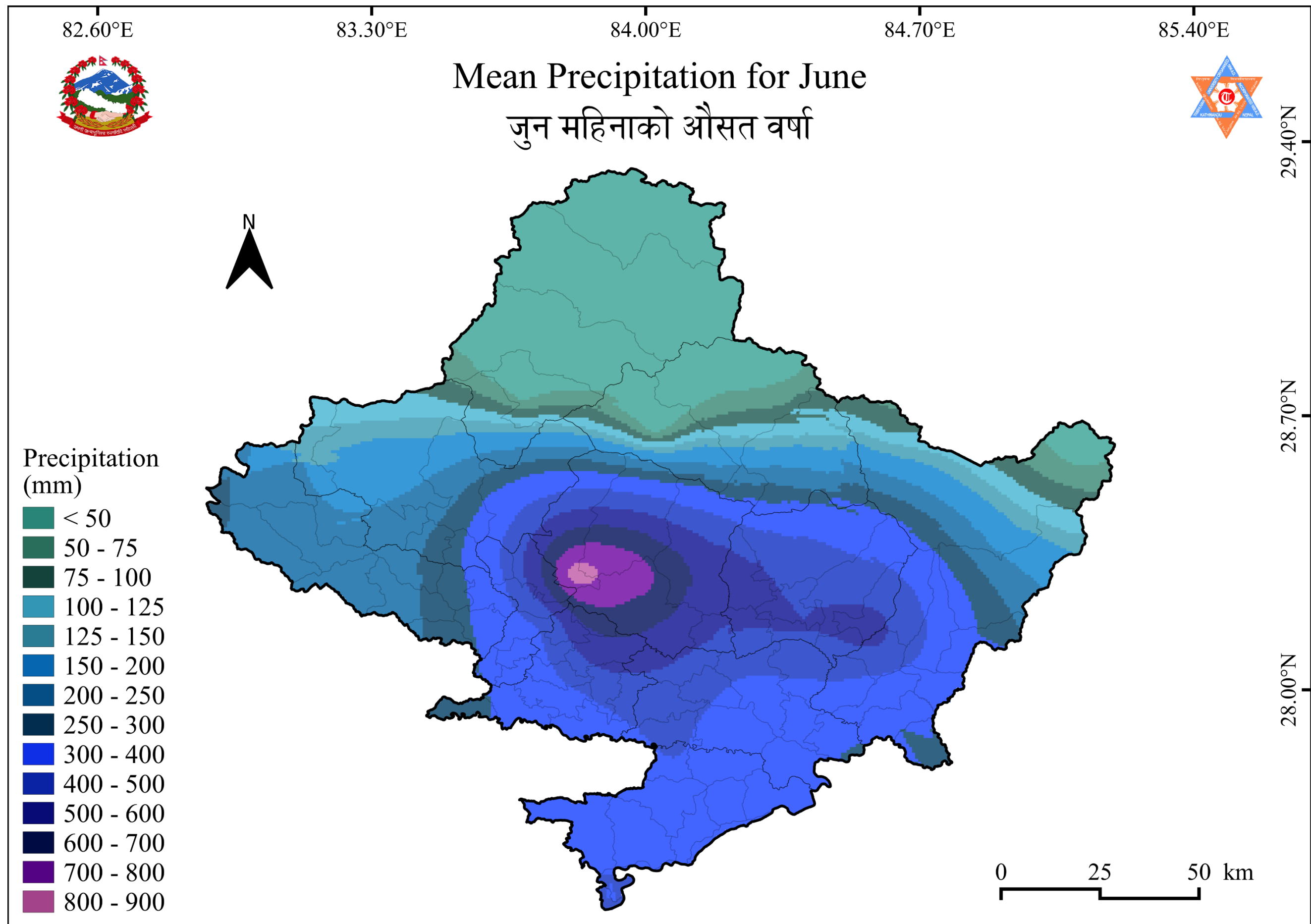


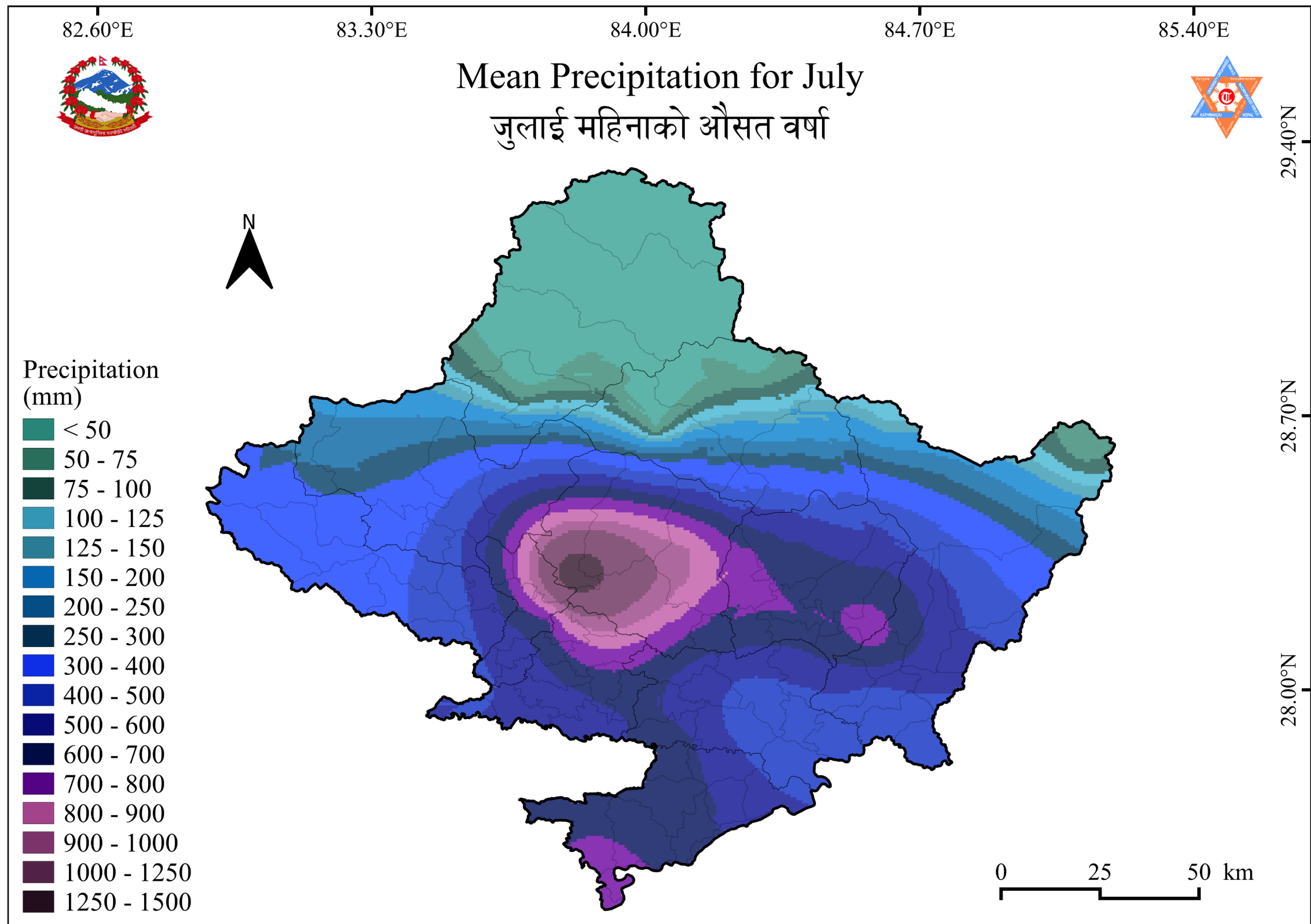


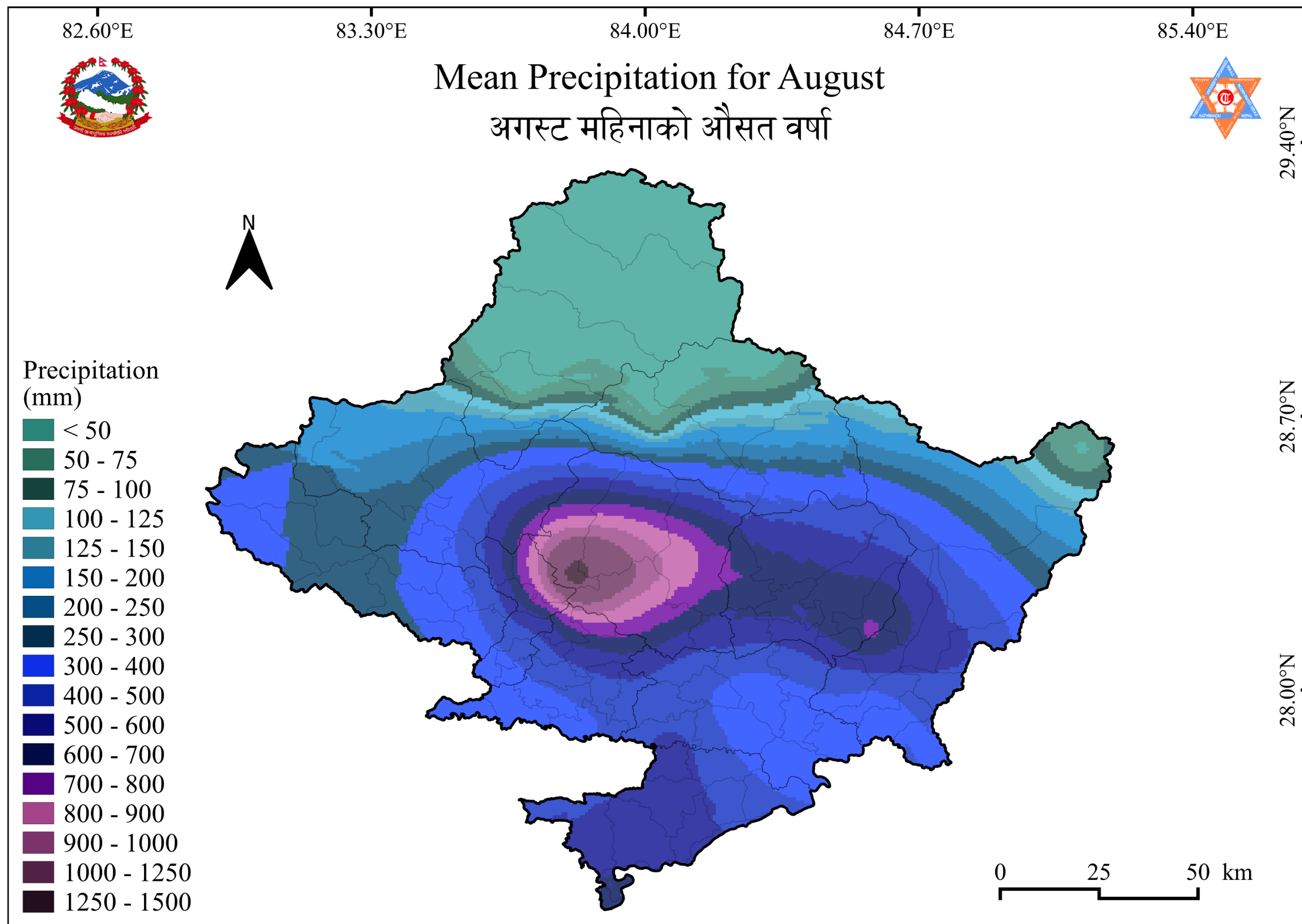


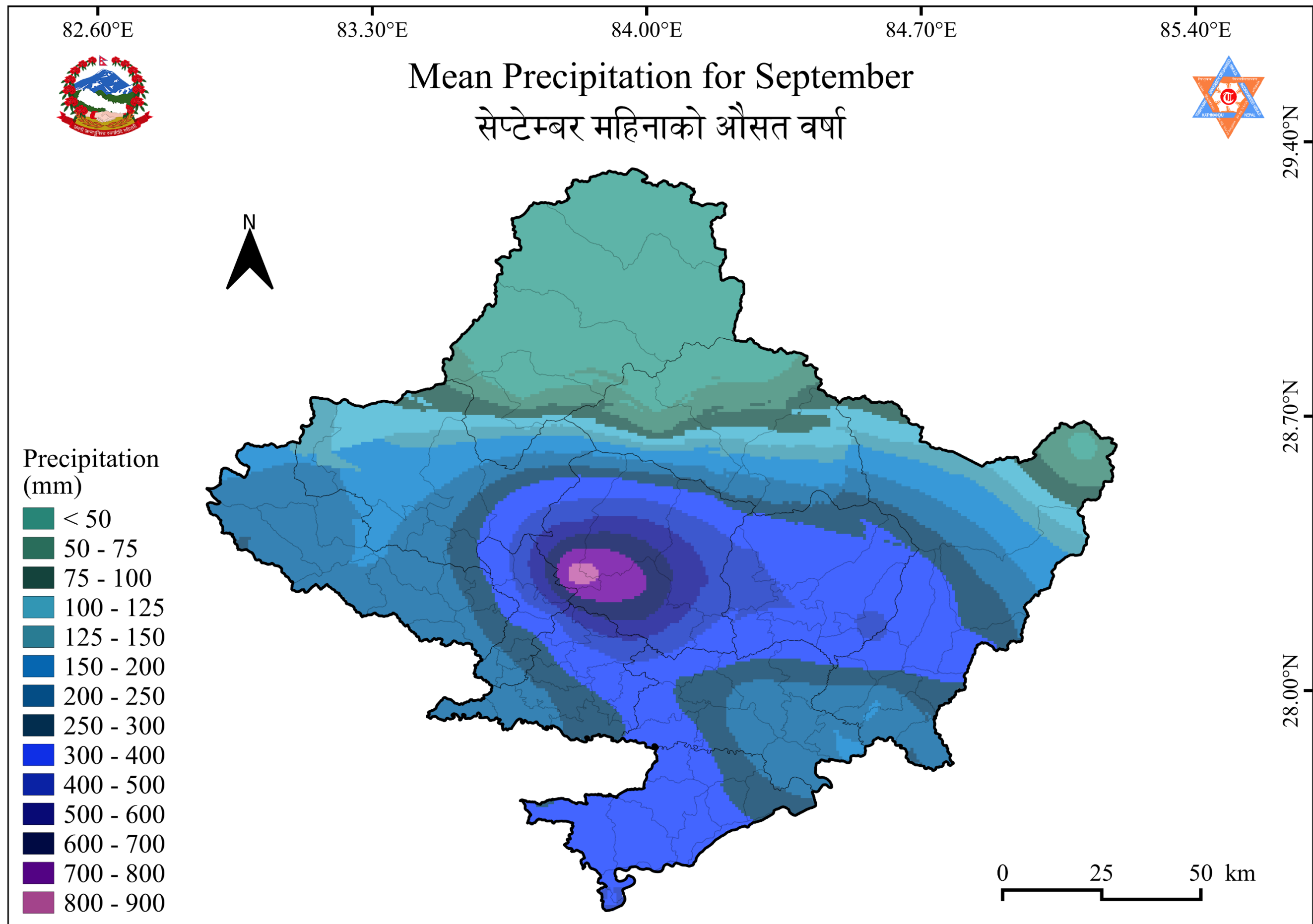


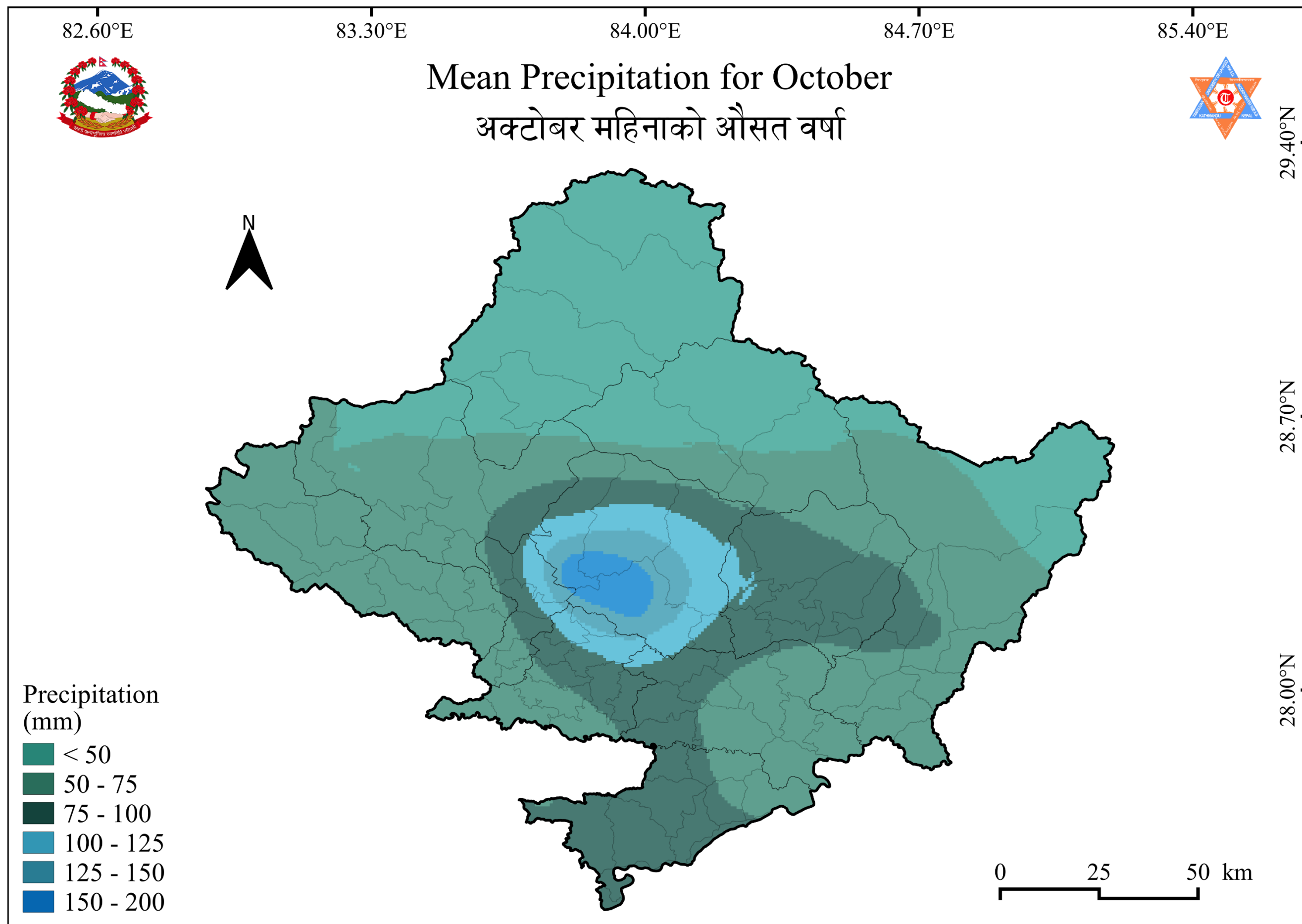


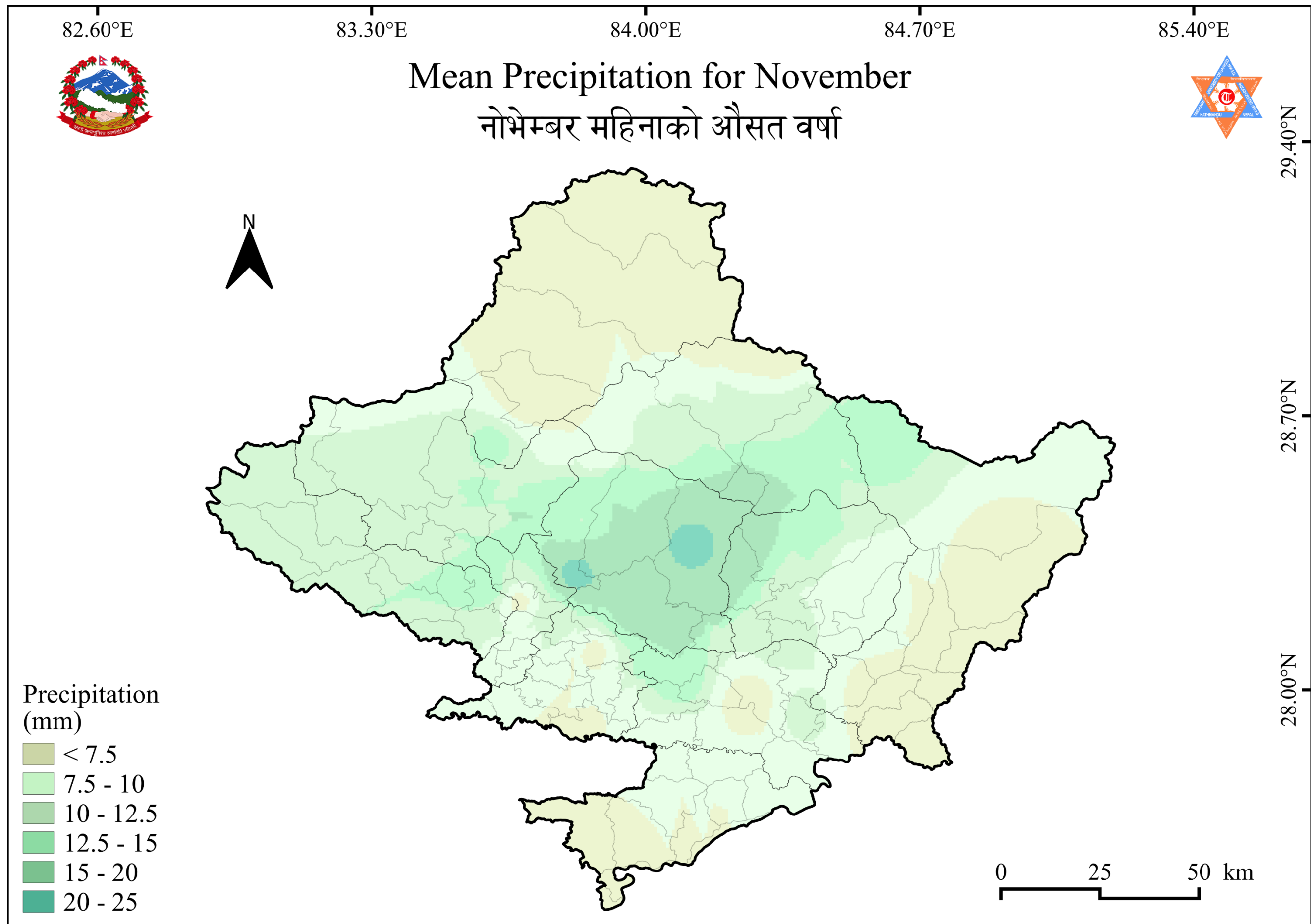


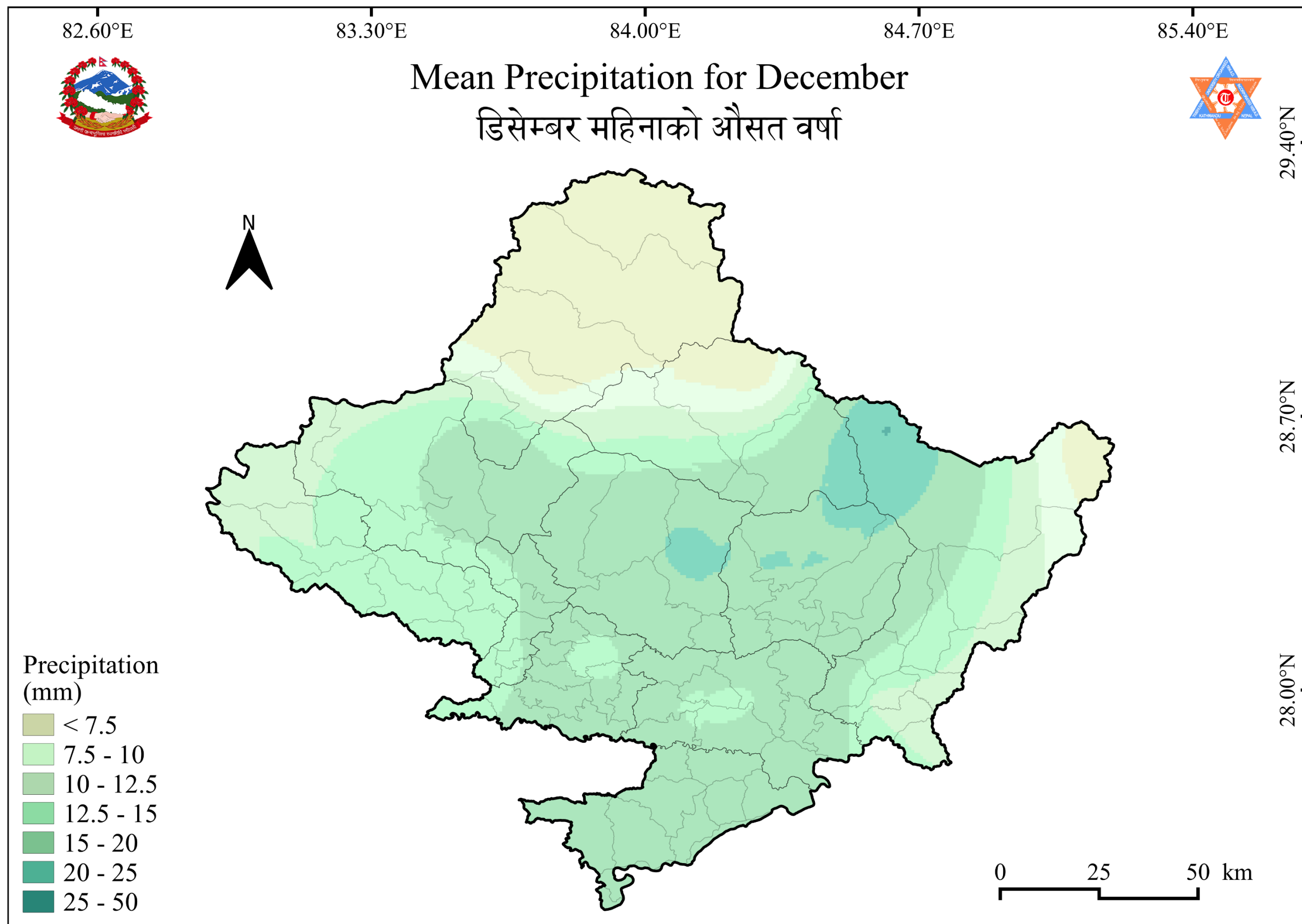


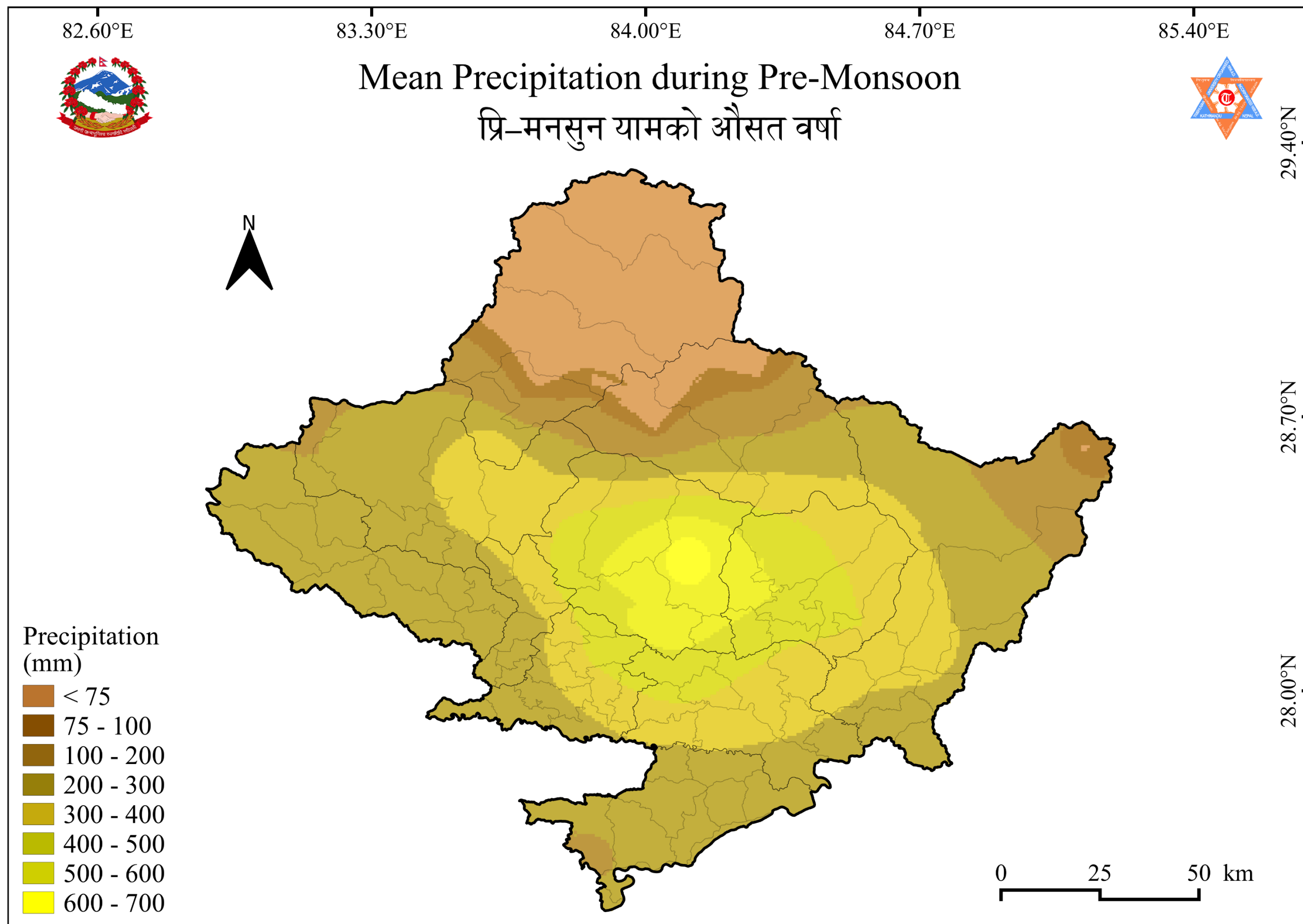


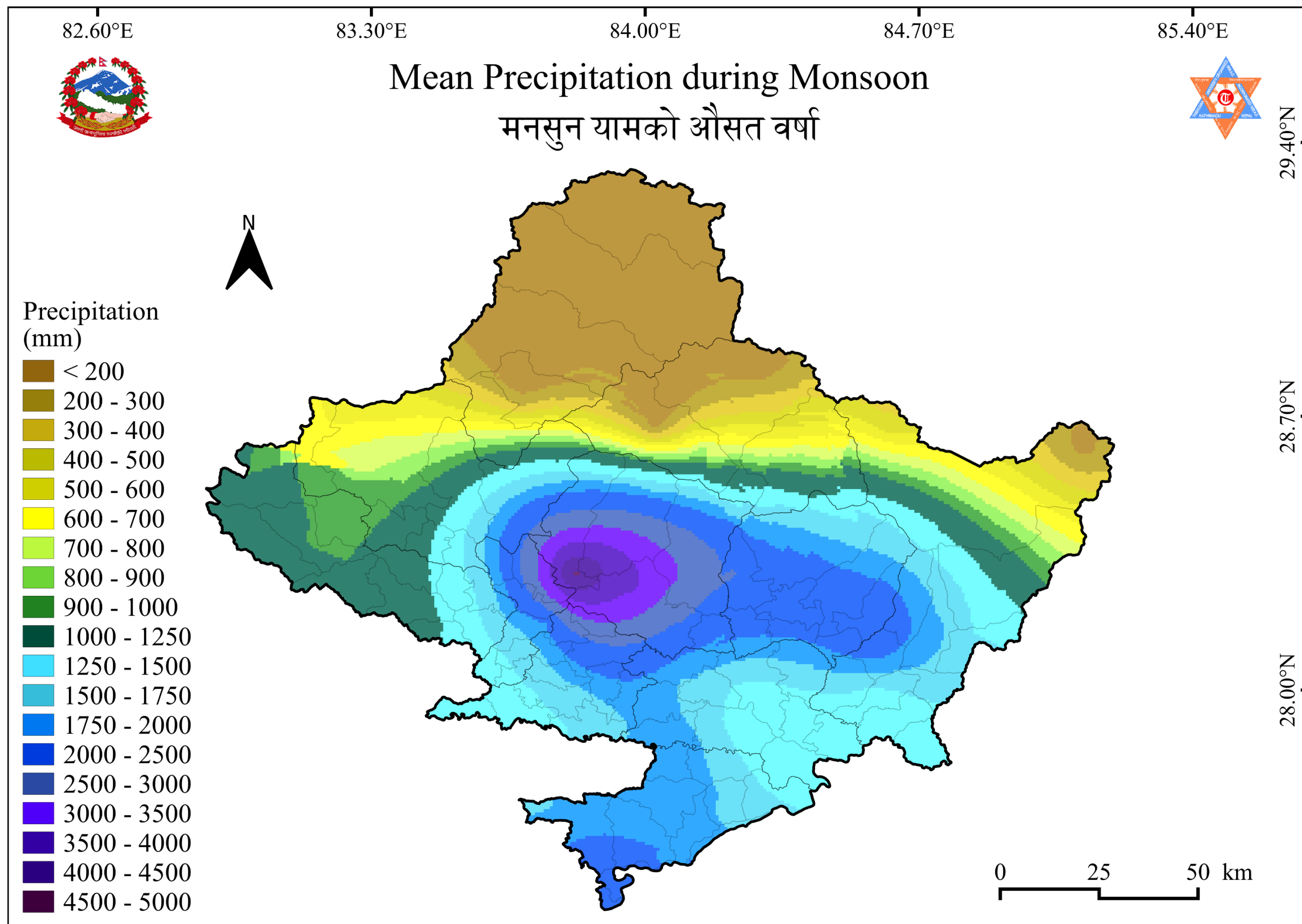


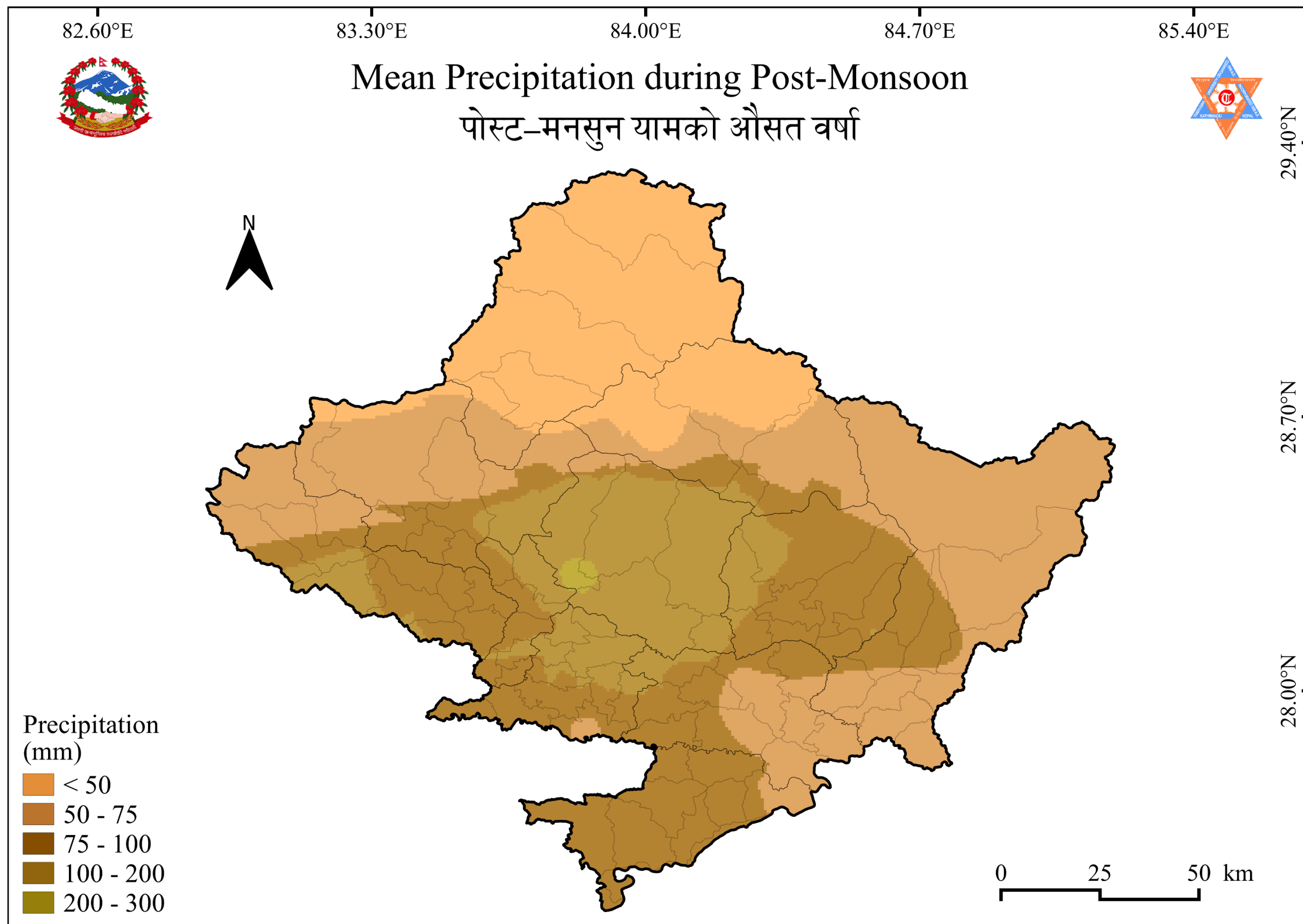


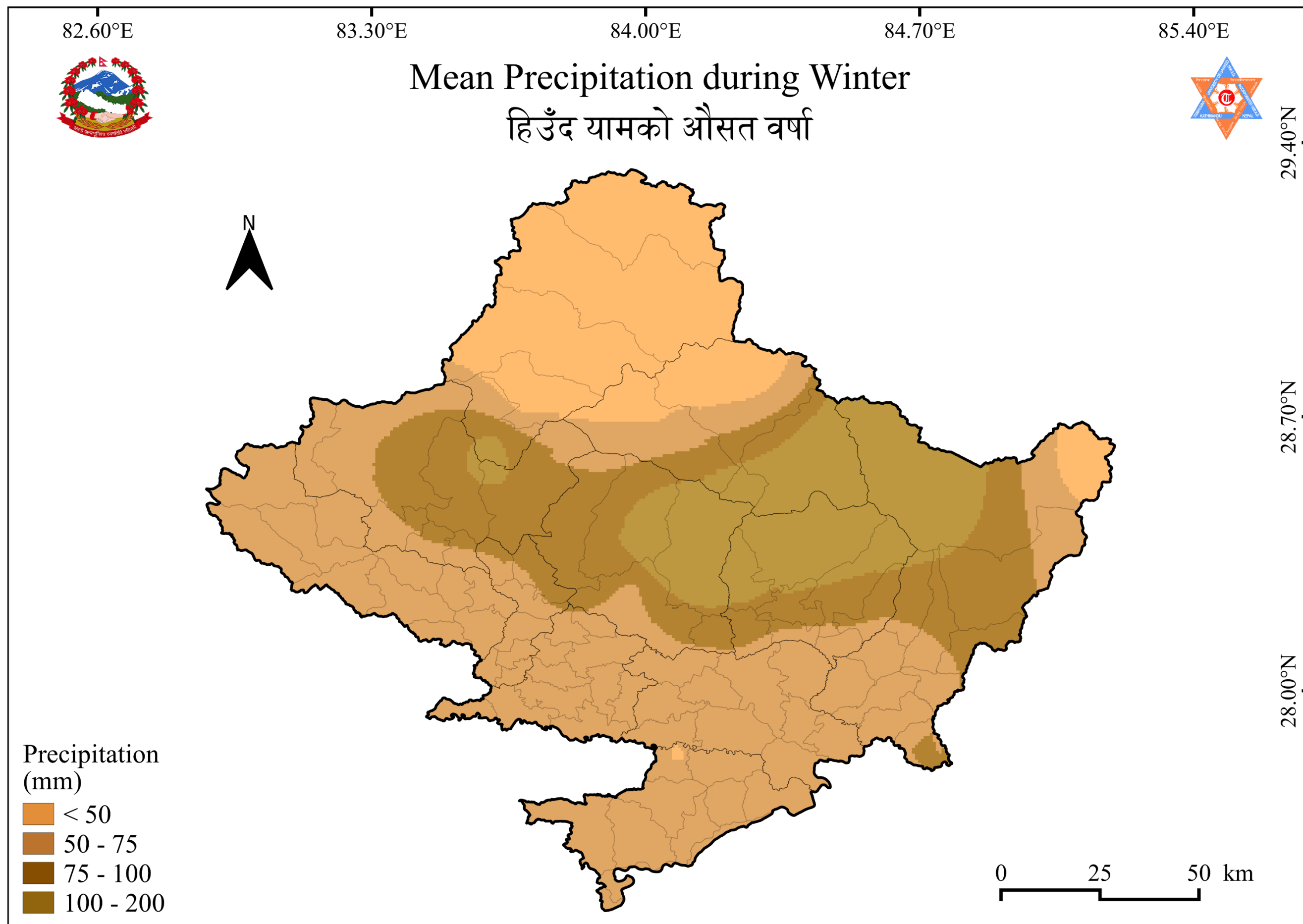


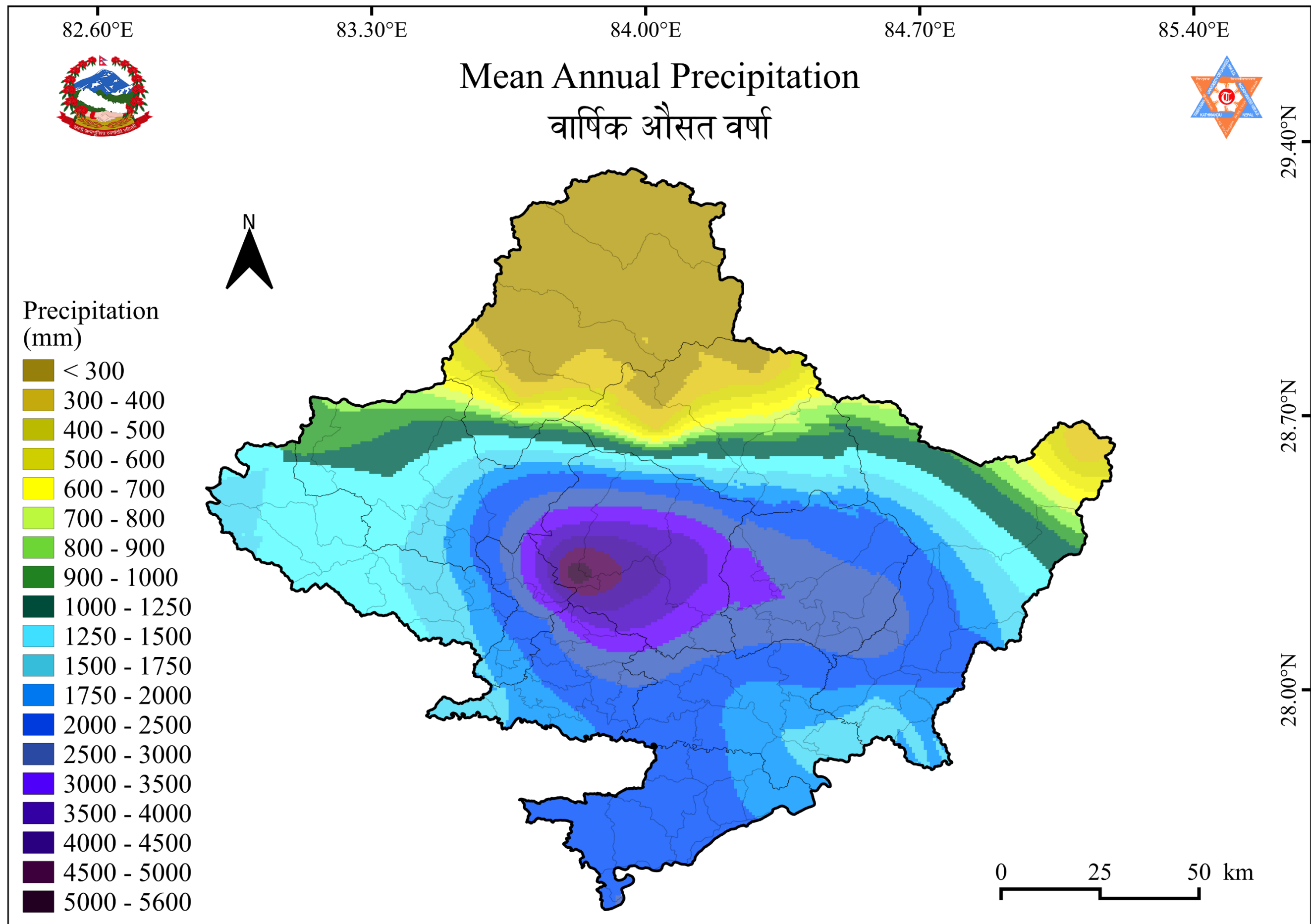


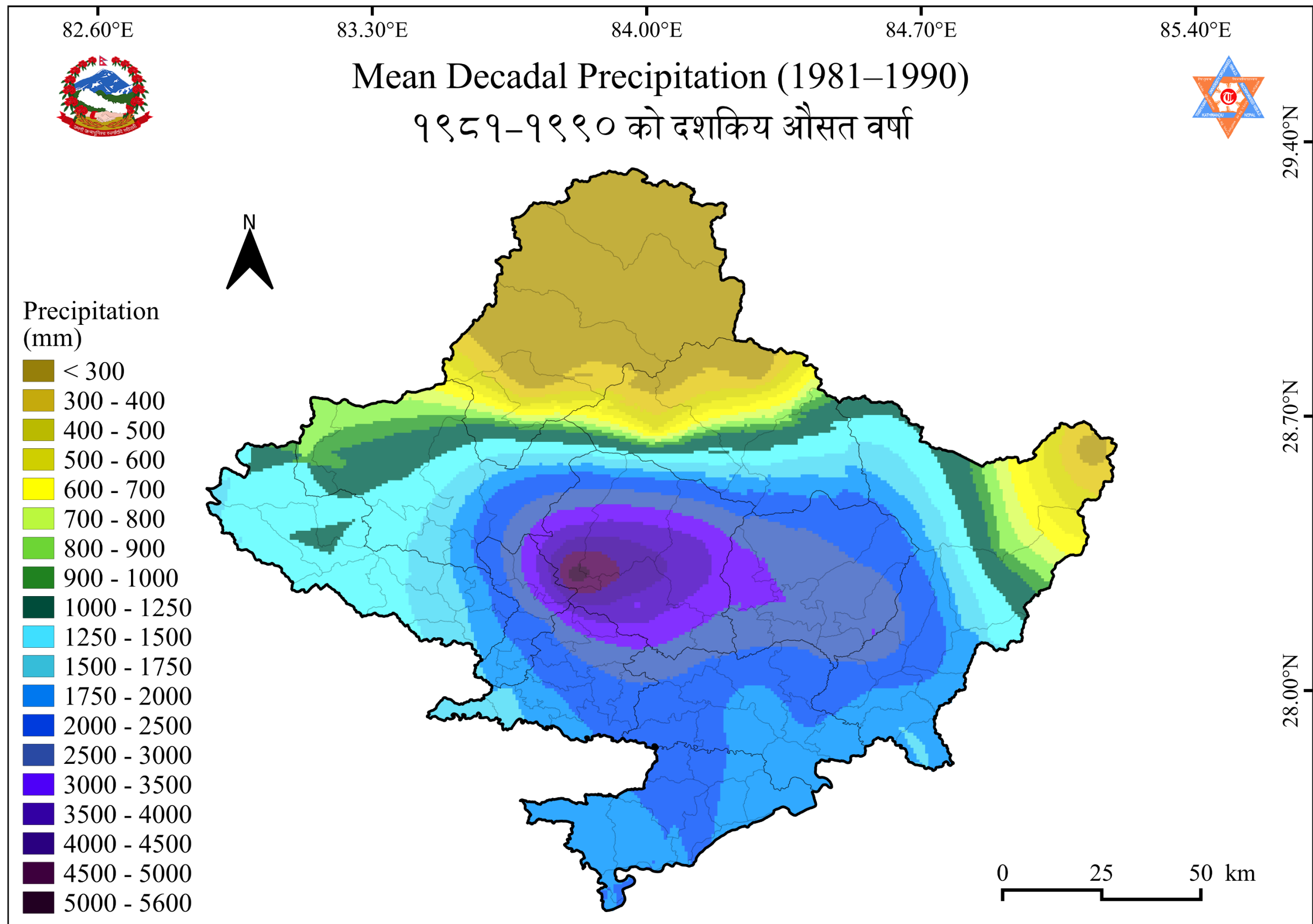


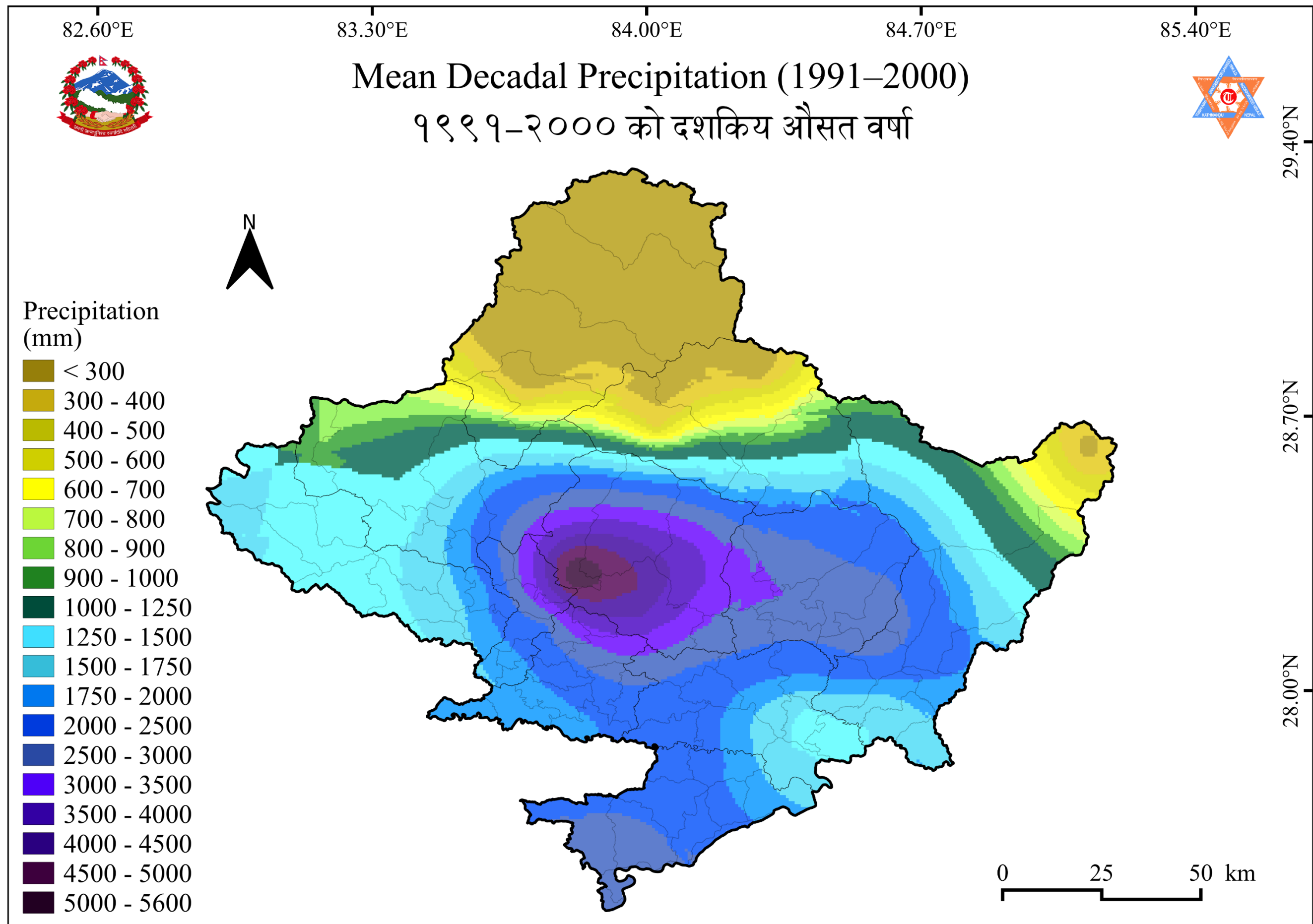


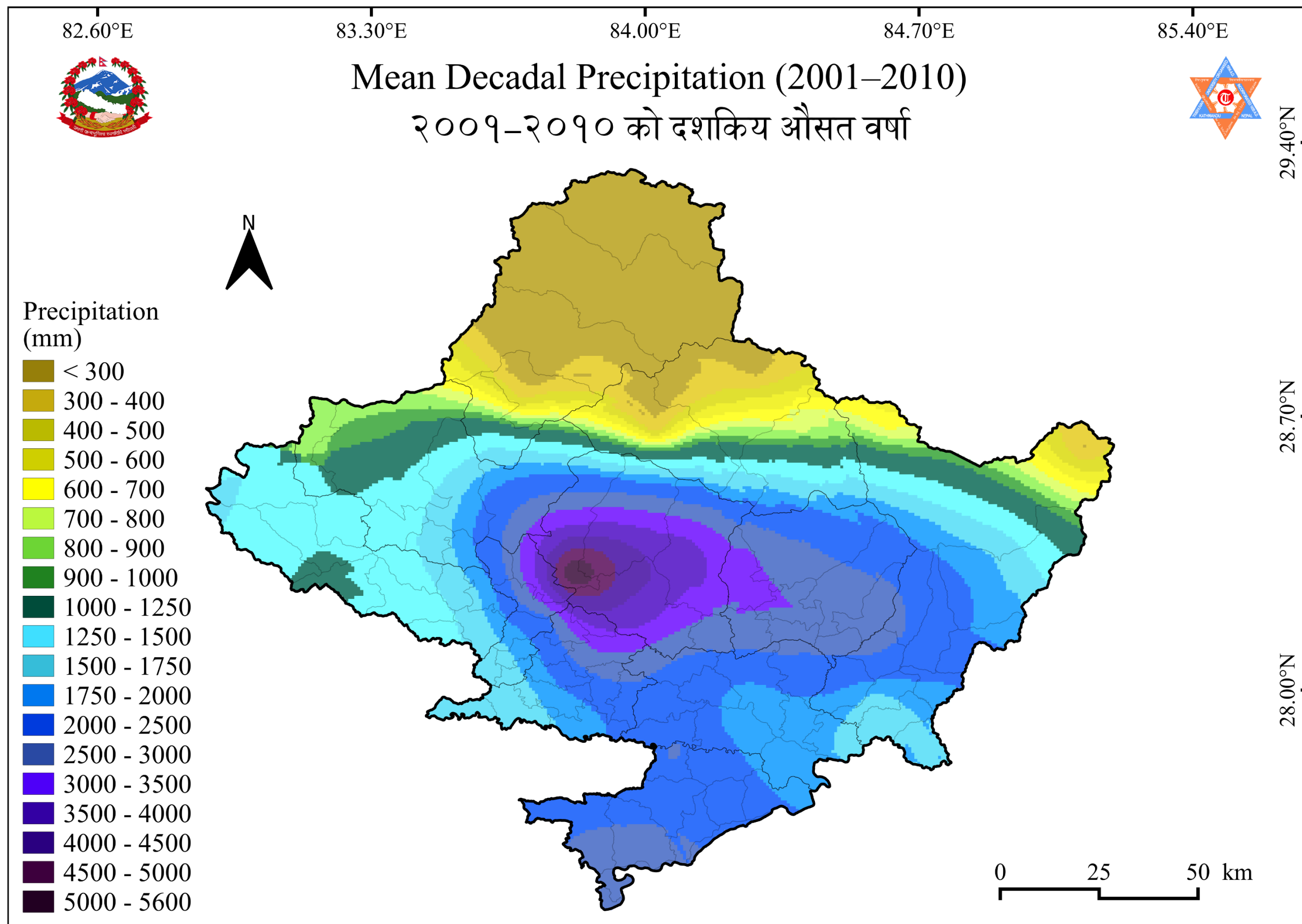


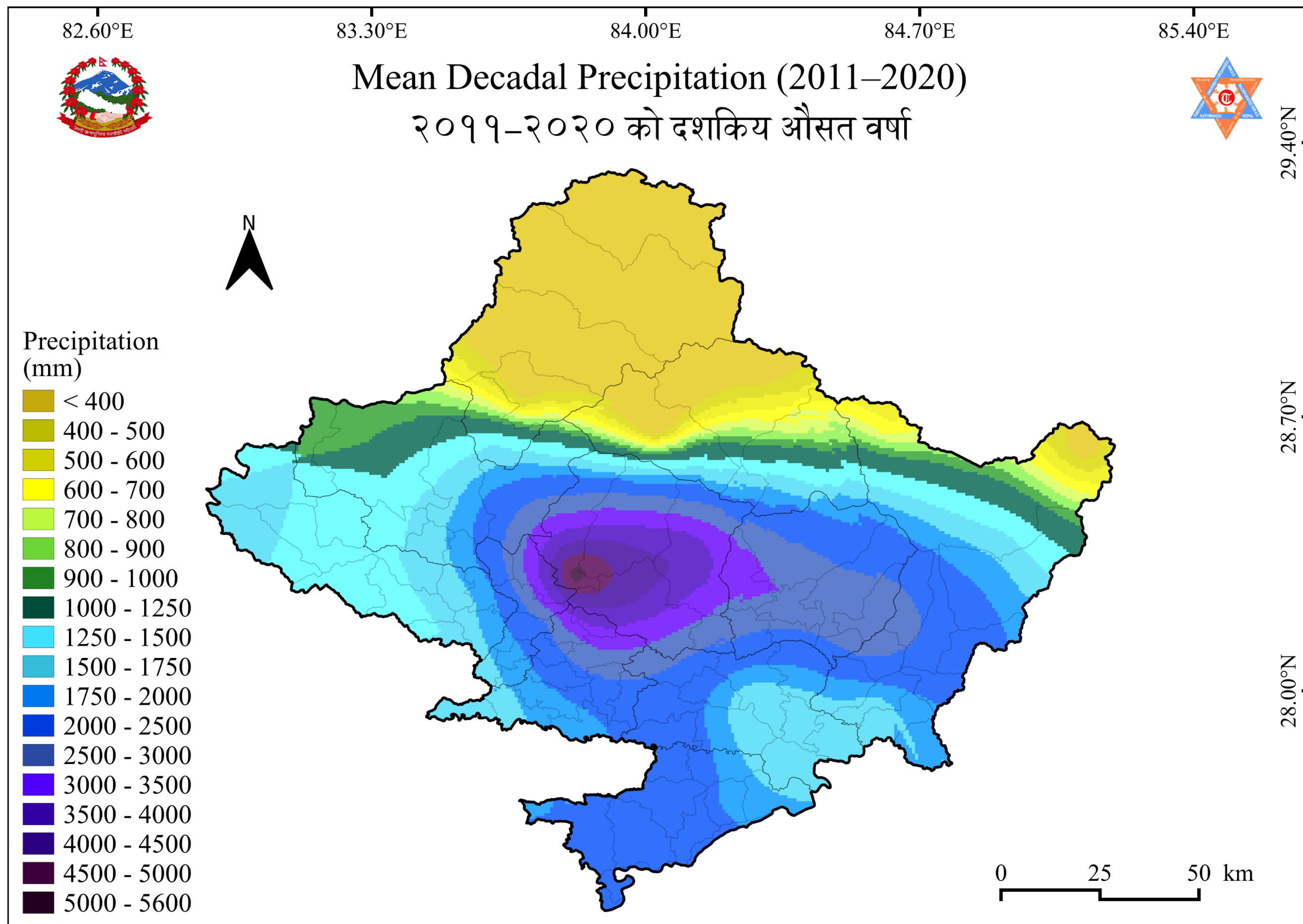












Section - 3

Extreme Precipitation Maps

