


A two-days workshop on Climate Change: Modelling, Mitigation, and Adaptation

The Central Department of Mathematics, Institute of Science and Technology, Tribhuvan University, Kathmandu Nepal organized a two-days workshop on Climate Change: Modelling, Mitigation, and Adaptation. The workshop started off on fourth April, 2024 Thursday and completed successfully on fifth April, 2024 Friday which took place inside the Central Department of Mathematics, TU, Kritipur, Nepal.

A two-days workshop on Climate Change: Modelling, Mitigation, and Adaptation	
Speakers: Prof. Dr. Deepak Aryal <i>HoD, Central Department of Hydrology and Meteorology, TU</i> Dr. Dinesh Pathak <i>HoD, Central Department of Geology, TU</i> Dr. Binod Pokharel, <i>Central Department of Hydrology and Meteorology</i> Dr. Madhav Ghimire <i>Central Department of Physics, TU</i> Dr. Rameshraj Pant <i>Central Department of Environment Science, TU</i> Dr. Bhanu Bhakta Neupane <i>Central Department of Chemistry, TU</i> Dr. Jeevan Kafle <i>Central Department of Mathematics, TU</i> With PhD, Mphil, Master Research Scholars	Date: Chaitra 22-23, 2080 Time: 11:30am to 4pm Organized by: Central Department of Mathematics, TU, Kritipur, Nepal  Contact Person Dr. Jeevan Kafle (Coordinator) Assistant Professor, Central Department of Mathematics, TU Registration Fee: Rs 200 For Registration: Sandesh Thakuri (9823580172)
Venue: Central Department of Mathematics, TU	

The chairman of the workshop was the HoD Prof. Dr. **Chet Raj Bhatta**. The workshop was coordinated by **Dr. Jeevan Kafle** who is a leading figure in mathematics and a faculty of the Central Department of Mathematics, TU whose area of research is modelling in natural and applied sciences. The organizing team consisted of **CDM Student Council** who took all the management responsibilities of the workshop under the leadership of the President of the Council **Mr. Sandesh Thakuri**. Other members of the team were:

- Sec. Manoj KC
- VP. Biddha Pokhrel
- Mem. Ranjan Kumar Chaudhary
- Treasurer. Dhakaram Regmi
- Surendra Chaudhary
- Mem. Jayanti Saud

The Chief-Guest of the workshop was the Dean of IoST, TU Prof. Dr. **Binil Aryal**.

Note books for the workshop was sponsored by the **Everest Engineering College, Kathmandu, Nepal**.

The workshop consisted of both online and physical sessions and a CDM alumni talk series session at the end. Seven experts from various central departments of TU came together to train during the workshop. The list of experts was as follows:

1. Prof. Dr. Deepak Aryal	<i>HoD, Central Department of Hydrology and Meteorology, TU</i>
2. Dr. Dinesh Pathak	<i>HoD, Central Department of Geology, TU</i>
3. Dr. Binod Pokharel	<i>Central Department of Hydrology and Meteorology</i>
4. Dr. Madhav Ghimire	<i>Central Department of Physics, TU</i>
5. Dr. Rameshraj Pant	<i>Central Department of Environment Science, TU</i>
6. Dr. Bhanu Bhakta Neupane	<i>Central Department of Chemistry, TU</i>
7. Dr. Jeevan Kafle	<i>Central Department of Mathematics, TU</i>

There was a guest appearance of a Professor from the South Asian University on the first day and a CDM alumni talk from Prof. Dr. Kedar Nath Upreti on the second day. Other guests were the President of Nepal Mathematical Society Prof. Dr. Narayan Prasad Pahari and various personal from Kathmandu University on the first day and various alumnus of this department on the second day. This workshop was attended by around **100 participants** from various central departments of TU and various campuses of TU and from Kathmandu University.



Objectives

This workshop was organized with the following objectives:

- Discuss Climate Change from various aspects
- Foster Collaborative Research
- Enhance Interdisciplinary Research
- Interaction between various departments of TU
- Interaction between Masters, MPhil and PhD Students.

Program and Schedule

Program: Day-1

Thursday, Chaitra 22, 2080

11:00 am - 11:30 am

Registration

11:30 am - 12:30 am

Inaugural Session

MC: Dr. Jeevan Kafle , Coordinator of Workshop		
Remarks by: Prof. Dr. Gyan B Thapa , President, CDM Alumni		[5 minutes]
Remark by: Prof. Dr. Dinesh Pathak , HoD, Central Department of Geology, TU		[5 minutes]
Remark by: Prof. Dr. Deepak Aryal , HoD, Central Department of Hydrology and Meteorology, TU		[5 minutes]
Remarks by Guest: Prof. Dr. Narayan Prasad Pahari , President, Nepal Mathematical Society		[5 minutes]
Remarks by Chief Guest: Prof. Dr. Binil Aryal , Dean, IOST, Tribhuvan University		[8 minutes]
Concluding Remarks: Prof. Dr. Chet Raj Bhatta , Head, Central Department of Mathematics, Tribhuvan University		[7 minutes]

Training Sessions:

MC: Dr. Pawan Shrestha, Assistant Professor, Central Department of Mathematics, TU

12:30 pm - 01:30 pm

Workshop-1 (*Impact of Climate Change on Southern Slope of Himalayan*)

Prof. Dr. Deepak Aryal

HoD, Central Department of Hydrology and Meteorology, TU

01:30 pm - 02:00 pm

High Tea

02:00 pm - 03:30 pm

Workshop-2 (*Student Presentations*)

03:30 pm - 05:30 pm

Workshop-3 (*Climate Change: Impacts, Mitigation & Adaptation*)

Dr. Rameshraj Pant

Central Department of Environmental Science, TU

Program: Day-2**Friday, Chaitra 23, 2080**

07:00 am - 08:30 am	Workshop-3 (High-Performance Computing in Data Science and Machine Learning Using Tribhuvan University Supercomputer) [Online] Dr. Madhav Ghimire , Central Department of Physics, TU
	MC: Mr. Ganga DC, Assistant Professor, Central Department of Mathematics, TU
11:00 am - 12:15 pm	Workshop-4 (Climate change and Geo-disaster in the Himalaya) Prof. Dr. Dinesh Pathak HoD, Central Department of Geology, TU
12:15 pm - 01:30 pm	Workshop-5 (<i>Nepal's Climate Conundrum: Dissecting the Evolving Extremes and Changing Climatic Landscape</i>) Dr. Binod Pokharel Central Department of Hydrology and Meteorology, TU
01:30 pm - 02:00 pm	<i>High Tea</i>
02:00 pm - 03:00 pm	Workshop-6 (<i>A nexus between climate change and microplastic distribution in water bodies</i>) Dr. Bhanu Bhakta Neupane Central Department of Chemistry, TU
03:00 pm - 04:00 pm	Workshop-7 (<i>Research in Mathematics and Its Exposure</i>) [CDM-Alumni talk-2] Prof. Kedar Nath Uprety Former Head, Central Department of Mathematics, TU, Nepal President, Mathematical Biology Research Center (MBRC), Nepal
04:00 pm - 04:30 pm	Closing

MC: **Dr. Jeevan Kafle**, Coordinator of Workshop

Remarks/feedback by participants [5 minutes]

Remarks by: **Mr. Sandesh Thakuri**, President, CDM Student Council [5 minutes]

Remark by: **Dr. Rameshraj Pant**, Central Department of Environmental Science, TU [5 minutes]

Remarks by: **Dr. Shree Ram Khadka**, Vice-president, Nepal Mathematical Society [5 minutes]

Concluding Remarks: **Prof. Dr. Chet Raj Bhatta**, Head, Central Department of Mathematics, Tribhuvan University [5 minutes]

The workshop had to be conducted by the Mathematics Department because at the heart of every research and problem solving tool there is mathematics. The workshop is about modelling, mitigation and adaptation. Every kind of scientific modelling is mathematics.



Dr. Jeevan Kafle

Inaugural Session

The workshop was inaugurated by the Chief-Guest and the Chairman of the workshop along with the distinguished guests at 11:45am. The Chief-Guest stressed on the increasing importance of mathematics in applied sciences. He mentioned that the real-world is chaotic, so the recent trend is to use statistical ways and the very recent trend is to use data-science because statistical ways is insufficient to handle huge data in applied sciences.



The Head of the Department of Hydrology and Meteorology, TU Prof. Dr. Deepak Aryal was one of the special guest; this workshop being a workshop on climate change. He spoke to the young researchers to focus on the modelling aspects of research and mathematics is the heart of modelling. He encouraged the young mathematicians to not just sit in the classroom and solve the book problems but to go to real world where mathematicians are more needed.



Prof. Dr. Chet Raj Bhatta



Prof. Dr. Narayan Prasad Pahari

Then the President of Nepal Mathematical Society spoke on the importance of collaborative research and the Chairman of the workshop welcomed everyone to the workshop and give his best wishes. Then other guests also spoke on emerging issues of climate change and responsibilities of the young scientists to solve this issue and gave their best wishes for the success of this workshop.

Training Session 1

Workshop 1

The first expert was the Head of the Department of Hydrology and Meteorology, TU Prof. Dr. **Deepak Aryal**. He gave training on **Impact of Climate Change on Southern Slope of Himalayan**. He showed that from the study of his team southern slopes are more affected by the climate change than the northern slopes; snows on the southern slopes are melting at an alarming rate. This has adverse effect on the life of Nepal as we are faced to the southern slopes.

Then he encouraged young students from the Central Department of Chemistry, TU to come out of the traditional chemistry lab and work on the natural lab of atmosphere where the reactions of chemistry are happening naturally. This new field of subject is atmospheric chemistry which is crucial in studying the phenomenon of climate and climate change.



Figure 1: Dr. Deepak Aryal

At 1:30 the session broke for lunch.

Workshop 2

In this session there were presentations from the **PhD Students** of Mathematics of Central Department of Mathematics, TU. The Presenters were Mr. Chudamani Pokharel, Mr. Pushpa Nidi Gautam, Mr. Bekha Ratna Dangol, Mr. Chet Nath Tiwari and Mr. Shankar Pariyar.

Mr. Pokharel presented on *Analysis of Blood Flow through Stenosed Artery with Einstein Viscosity*, Mr. Gautam presented on *Blood Flow through a Curved Stenotic Artery*, Mr. Dangol presented on *Complex Granular Slides and Flow-Obstacle-Interaction*, Mr. Tiwari presented on *Novel Mathematical Models for Impact Pressure and Mobilization Length* and Mr. Pariyar presented on *Fractional Advection Diffusion Equations in Caputo-Fabrizio Sense*.

Workshop 3

The expert of session was **Dr. Rameshraj Pant** of Central Department of Environmental Science, TU. He gave training on Impact of Climate Change in Nepal and its Mitigation and Adaptation. His talk was very descriptive and informative. His conclusion was that the climate change has very adverse effect in Nepal. It has affected our agriculture, our weather and our overall life style. Heavy rain in summer and drought in winter and the change in vegetation and habitats of wild animals are among the effects.



Training Session 2

Workshop 4 : Online Session

The expert of the online session was **Dr. Madhav Ghimire** of Central Department of Physics, TU who gave the training via zoom-meeting. This session was open to everyone and most participants were from physics department.

The training Dr. Ghimire gave was on how to use **super computer** of Tribhuvan University. Artificial Intelligent, Deep Learning, Data Analysis, are crucial tools in modern research. The predictions and forecast of weather is not possible without use of these tools and these tools needs a super computer. In fact any heavy data based research needs a super computer. He also show-cased the research done by his team in solid physics to the participants.

Workshop 5

The expert of this session was Head of Central Department of Geology, TU Dr. **Dinesh Pathak**. He gave training on *Climate change and Geo-disaster in the Himalaya*. The relation between climate change and geo-disaster was discussed. He then trained on evacuation and safety measures during disasters. He then show-cased the effect of climate change on various geological terrains of Nepal. He also talked on publishing research articles in Journals.



Figure 2: Dr. Dinesh Pathak

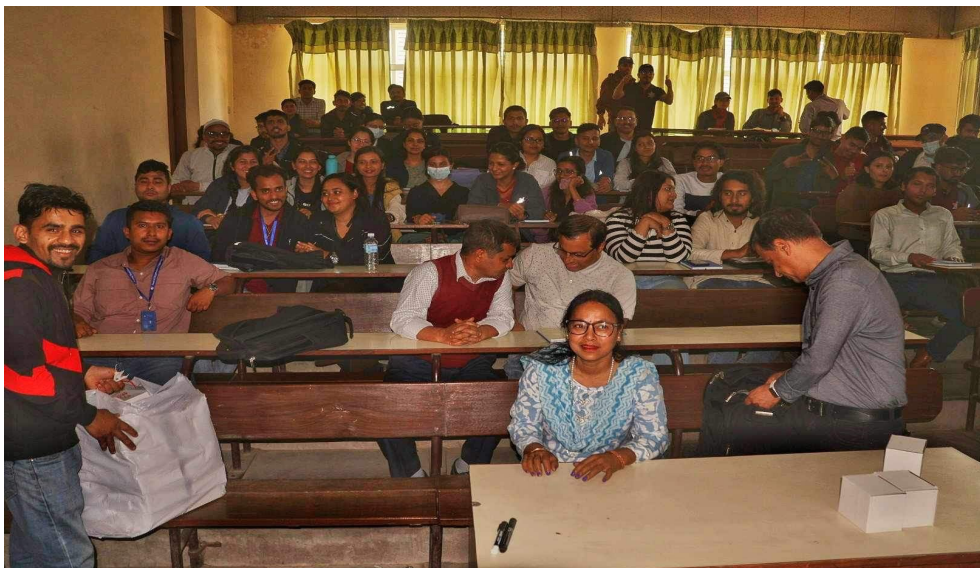
Workshop 6

The expert of this session was Dr. **Binod Pokharel** of Central Department of Hydrology and Meteorology. He gave training on *Nepal's Climate Conundrum: Dissecting the Evolving Extremes and Changing Climatic Landscape*. He trained the participants on the global warming and its effects on rainfall of Nepal. The effect is that winters are getting dryer and summers are getting wetter which has result drought in recent winters in Nepal and heavy rainfall in recent summers in Nepal. His training was based on a **mathematical model** which used exponential function. The water vapour holding capacity of atmosphere exponentially increases with the increase in temperature.



Figure 3: Dr. Binod Pokharel receiving token of love

At 1:30 noon the session broke for lunch.



Workshop 7

The expert of this session was Dr. **Bhanu Bhakta Neupane** Central Department of Chemistry, TU. He gave training on **A nexus between climate change and microplastic**. Microplastics are plastic particles of a very small size. They are emerging issue of today's polluted world. These inorganic particles have adverse effects on both health of biological beings and on climate change.



Figure 4: Dr. Neupane receiving token love

Workshop 8

This session was the *CDM alumni talk series* by the former Head of Central Department of Mathematics Prof. Dr. **Kedar Nath Upreti**. The topic of the talk was Research in **Mathematics and Its Exposure**.

He discussed the methods and ways of doing an academic research. An academic research is generally a thesis writing or an article writing which is a challenging job. It requires time and knowledge and hard-work of the researcher. Generally it starts with a selection of a supervisor and a topic of research. Then he discussed the methods of publishing research papers and challenges faced during publication. Finally he discussed the issue of plagiarism in research papers which is a serious issue.

Closing Session

Remarks by the Participants

Three participants from three different departments came forward to give their remarks on the workshop. First Mr. **Aditya Adhikari** of Central Department of Mathematics, TU remarked that the workshop was successful in promoting collaborative research and interdisciplinary research. Second **Dinesh Raj Regmi** of Central Department of Geology remarked that this workshop was helpful in bringing researchers from different backgrounds together in discussing the common issue of climate change and such programs should be conducted frequently. Third Ms. **Saraswoti Pokhrel** of Central Department of Chemistry, TU remarked that the workshop had met her and her friends' all expectations except they expected more training than talks on the workshop. Other than that, they had a great time and would look forward to such events organized by the Central Department of Mathematics.

Remarks by the President of CDM Student Council

The President Mr. Sandesh Thakuri thanked Dr. Kafle and Dr. Bhatta for organizing such a historic event. He said, "We had to come together but hadn't found a convincing issue to do



so. Climate Change seems to be the general issue that has brought us all together here. It has been my own wish for a very long time to bring all the departments of TU under the same roof of mathematics. Mathematics can be that unifying agent as it is universal and general. Mathematics needs every subject and every subject needs mathematics. It seems climate change and all the issue of modern world needs a general solution a solution from every sector, which demands a strong collaboration. A complete solution is not possible without a strong collaboration. **Mathematics can be that glue of that collaboration.**

The departments of TU are very close in terms of distance but very far in terms of collaboration. This distance needs to be shortened and removed. Every kind of research is being done in Central Department of Mathematics; research about blood, about evacuation, ... Research on same topics are also being done in the respective departments. "

Then he gave a big thank you to the Council for working so hard to make this workshop successful.

Concluding Remarks

Then Dr. Ramesh Raj Pant and Vice President of Nepal Mathematical Society Dr. Shree Ram Khadka give their remarks about the workshop. Finally the workshop was concluded by the chairman of the workshop Head of Central Department of Mathematics, TU Prof. Dr. Chet Raj Bhatta by declaring the success of the workshop and giving a big thank you to the organizing team.

News and Reports

The news of the workshop was covered by the two national online news portals. The first day of the workshop was covered by the **Bygankhabar** media: [News Link1](#).

The second day of the workshop was covered by the **Boudhakhabar** media: [News Link2](#)

Certificate Distribution Clips



Figure 5: At Central Department of Hydrology and Meteorology

List of registered Participants

मिति २०२०/१२/२२-२३ मा त्रि.वि. जडिता केन्द्रिय
विभागमा हुने A Two Day Workshop on Climate
Change: Modelling, Mitigation and Applications
विषयक कार्यशाला/गोष्ठी मा सहभागिता जनाउने.

क्र.सं.	नाम	संस्था/मौलिक	हस्ताक्षर
1.	Nabin Lamichhane (CDC, TU)	9846635988	
2.	Sita Parajuli (CDC, TU)	9824427417	
3.	Saraswati Pokhrel (CDC, TU)	9867470402	
4.	Sangita Dumbre	9867285636	
5.	Sangita Mishra (")	9762438540	
6.	Norah K. Rajbanshi (CDM, TU)	988974688796	
7.	Phanu Bhakta Neupane (CDC, TU)	9857185467	
8.	Dharmendra Chaudhary (CDM, TU)	9826402838	
9.	Sujan Dal Shrestha (CDM, TU)	9803478188	
10.	Bekha Dangol (CDM, TU)	9841526121	
11.	Sireeta Shrestha (CDHE, TU)	9841343097	
12.	Sadikulya Gyawali (CDC, TU)	9860473932	
13.	Sorjan Chhetri (CDM, TU)	9842744301	
14.	Shiva M.C.	9865123149	
15.	Riya Thapa	9847370806	
16.	Mukta Thapa (KU)	9803078409	
17.	Priyanka Panta (")	9817311154	
18.	Laxman Bdr. Saud (CDM, TU)	98658802381	
19.	Sandhya Adhikari (CDC, TU)	9866025653	
20.	Samundra Timilsina (CDM, TU)	9817160613	
21.	Santa Kumar Chaudhary	9868336009	
22.	Dhakar Ram Regmi	9856033004	
23.	Dinab Lal Yadav	9845005050	
24.	Manoj K.C.	9869007207	
25.	Ranjana K. Chaudhary	9807007674	
26.	Surendra Chaudhary	9873983757	
27.	Ram G. Magar	9846922123	
28.	Sushmita Thapaliya (CDM, TU)	9861931423	
29.	Deepak Aryal (CDM, TU)	9851073460	
30.	Kalpana Neupane (CDP, TU)	9846863628	
31.	Rameh Gautam (CDM, TU)	9841665012	
32.	Chet Nath Thapa (CDM, TU)	9851049391	
33.	Bishal Bikram Kunwar (CDM, TU)	9815116723	
34.	Bikas Tamang (CDM, TU)	9843082608	
35.	Santosh Lamichhane (CDM, TU)	9815158642	
36.	Aditya Adhikari (CDM, TU)	9817314600	
37.	Jitendra Khanal	9818300585	
38.	Upendra Bogati (CDM, TU)	9865623466	
39.	Upendra Kumar Sahani (CDM, TU)	9821268366	
40.	Rajina Devkota (COC, TU)	9863802727	
41.	Sabina Panth (COC, TU)	9867173282	
42.	Prajwal Acharya (COC, TU)	9864444887	
43.	Chudamani Pokharel (CDM, TU)	9847621534	
44.	Shradha Kandel (COC, TU)	9867715231	
45.	Shrestha	9861619107	

48.	Kapil Aryal	COC, TU.	9749380190	<i>OK</i>
49.	Dimesh Raj Regmi	CDG, TU	9862973872	<i>Dimesh Raj Regmi</i>
50.	Manju	ED ASCO	9849077015	<i>M</i>
51.	Biddha Pokhrel	CDM	9867375561	<i>Udaya</i>
52.	Anjana Pokharel	"	9840822100	<i>Ani</i>
53.	Kul Prasad Dhigav	CDHM	9861155317	<i>Pravin</i>
54.	Tek Raj Thani	"	9840241000	<i>Pravin</i>
55.	Suryog Bhattarai	CDHM	9843191587	<i>Pravin</i>
56.	Kripesh Achikari	"	9860376513	<i>Pravin</i>
57.	Nistha Niraula	"	9860463212	<i>Pravin</i>
58.	Aakriti Pokharel	"	9860682599	<i>Pravin</i>
59.	Gaurab Nepal	CDHM	9843401667	<i>Pravin</i>
60.	Siva Manandhar	CDHM	9861282899	<i>Pravin</i>
61.	Sachi Chaudhary	CDHM	9813324918	<i>Pravin</i>
62.	Mamata Simyeh	TC, TU	9868686162	<i>Pravin</i>
63.	Mishak Limbu Chumjong	TC, TU	9840166858	<i>Mishak</i>
64.	SUGASH POKHREL	CDG, TU	9846757717	<i>Pravin</i>
65.	SARASWOTA Bhandari	CDM, TU	9844909788	<i>Pravin</i>
66.	Mamata Chaudhary Tharu	"	9810800573	<i>Pravin</i>
67.	Gopal Devkota	"	9848517617	<i>Pravin</i>
68.	Sangita Chaire	CDG, TU	9847471369	<i>Pravin</i>
69.	Sanderp Bhatta	TC, TU	9865034857	<i>Pravin</i>
70.	Ureeta Aryal	TC, TU	9893845219	<i>Pravin</i>
71.	Pooja Pal	CDG, TU	9762422443	<i>Pravin</i>
72.	Dinesh Yadav	CDG, TU	9861736560	<i>Pravin</i>
73.	Shankar Kharel	CDG, TU	9867373533	<i>Pravin</i>
74.	Shankar Pariyar	CDM, TU	9849762508	<i>Pravin</i>
75.	Gajal Kandangwa	CDG, TU	9806088356	<i>Pravin</i>
76.	Dakya Kandel	CDG, TU	9861165483	<i>Pravin</i>
77.	Jayadev Nath	CDM, TU	9848899756	<i>Pravin</i>

No.	Name.	Department.	Mobile.	Signature.
78.	Rajesh Thakur	CDM, TU.	9866894681	<i>Rajesh</i>
79.	PAWAN KUMAR KURMI	CDC, TU.	9863475361	<i>Pawan</i>
80.	SUBIP CENTURY B.K.	CDC, TU.	9823670118	<i>Subip</i>
81.	Jeneviya Chaudhary	CDG, TU	9867484886	<i>Jeneviya</i>
82.	Pankaj Nath Chaudhary	CDG, TU	9841851542	<i>Pankaj</i>
83.	Sonal K. Gupta	CDG, TU	9867165464	<i>Sonal</i>
84.	Bishnu Panthi	CDG, TU	9866640745	<i>Bishnu</i>