Comprehending Climate Change in the Himalayas: An exercise in digital storytelling

Emily Carlson
SIT Study Abroad

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Comprehending Climate Change in the Himalayas:
An exercise in digital storytelling

Carlson, Emily N.
Academic Director: Onians, Isabelle
Gustavus Adolphus College
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Abstract

This study was completed as an attempt to visualize, contextualize, and humanize the effects of climate change in the Himalayan orogen through the lens of digital storytelling. The ArcGIS software application, Story Maps, was used to create a highly visual “storytelling” webpage. It combines spatial and empirical data from across the whole Himalayan range with stories and case studies collected in eight villages of Lower Mustang, Nepal. This project is thus a union of climatologic and ethnographic research. As climate change continues to charge ahead in an incredibly vulnerable part of the world, the people of the region face the challenges of natural disasters, season unpredictability, undependable water resources, and the uncertain future of these resources. 27 interviews were conducted in eight villages of the Lower Mustang region of Nepal: Lupra, Kagbeni, Phalyak, Dhagarjun, Pigling, Tiri, Jharkot, and Chongur. The final Story Map website presents these experiences in a highly visual and interactive manner; thus, the dissemination of the resulting discussion is much more accessible and engaging than a traditional academic journal entry. The ultimate goal of this project is to act as a call to action, encouraging those who are more cushioned from the effects of climate change to be inspired to make drastic lifestyle changes on behalf of the people of Mustang and beyond.
Acknowledgements:

First and foremost, I would like to thank my parents for giving me the countless opportunities that have allowed me to find myself here, studying and conducting research in Nepal. My family’s unending support is a gift I will never deserve or be able to repay.

I also would like to thank Sangmo “Metok” Gurung for her incredible assistance in conducting fieldwork in Mustang. Without Metok, I would have been lost and sad and likely still stuck somewhere in Pokhara. I would also like to thank her family in Chongur for being incredibly welcoming and loving hosts to us during our visit.

Thanks to SIT for developing a program that has allowed me to grow so much intellectually and personally. It is truly incredible what the staff manages to pull off semester after semester!

Thank you, Dr. Krishna Poude of the Nepal GIS Society for encouraging my work and providing invaluable resources and advice.

Finally, thank you peers of SIT for being the best family and support system a person could ask for while abroad.
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A Few Notes

a. This write-up contains only the conventional portions of an academic paper as well as the core of the Story Map content. Please view the site in a browser to interact with the models, maps, and photos, as well as videos and testimony from the people of Mustang.

b. All photos were taken by the author unless otherwise noted.
Introduction and Purpose

Climate change issues are nothing new. We know what the effects are and what we should be doing to save the earth. But are we motivated enough to actually make changes?

The main goal of this Story Map project was to portray a complex issue in a compelling, visual manner by combining empirical data from climate scientists with ethnographic cases studies from eight villages in Lower Mustang, Nepal.

The project was created this way to encourage those of us who do not experience these more drastic effects of climate change to keep the stories presented here in mind when we are considering making sustainable changes to our lifestyles.

Figure 1: Suspension bridge in Lower Mustang, Nepal

In its entirety, this project is a call to action.

Now more than ever, we have the responsibility to be dutiful stewards of the Earth – not just to protect ourselves and our future, but to protect those who are at this very moment being affected and displaced because of climate change.
Methodology

Lower Mustang, Nepal was chosen as a study area for its ease of access and proximity to climate-related events. Eight villages were visited within the Lower Mustang Region. Stories and testimony from residents of all villages are interspersed throughout the Story Map, but a map is bookmarked to the upper right of the screen (under "Study Area") for easy reference.

Stories and personal accounts were gathered with tremendous help from co-researcher and interpreter, Sangmo “Metok” Gurung. All quotes and photos shown here were received and used with permission from the interviewees.

A Brief Background (and why we should care)

The Himalayas represent one of the most important and most vulnerable fresh water resources in the world. The Himalayas are home to around 50,000 of the world's nearly 200,000 glaciers, but they are rapidly disappearing.1 High elevation glacial and snow melt feed the Indus, Ganges, Yangtze, Yellow, and Brahmaputra rivers, inspiring the mountain range's nickname: the "Water towers of Asia."2

Estimates pose that these 5 rivers provide fresh water to around 2 billion people.4 Any threat to the stability and reliability of this resource means a threat to the world's most populated countries.

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3 Ibid.
4 Ibid.
In Nepal, specifically, a heavy reliance on agriculture and adventure tourism makes the economy especially sensitive to the effects of climate change. The mountainous, desert ecosystem of the upper Himalayas is also particularly sensitive to air pollution, where there is little vegetation to absorb CO₂.

The majority of people living in this vulnerable ecosystem are vulnerable themselves:

- 80% of Nepal's population works some form of agriculture
- 82.5% of Nepal’s population lives below the international poverty line of $2 per day.⁵

This is why we should care - because those doing the least damage are experiencing the worst of the effects.

Research Findings: The Lived Effects of Climate Change

As the world grows warmer at increasingly alarming rates, effects in the Himalayas will develop in the following (simplified) arc:

1. Increasing temperatures result in rapid and widespread melting of glaciers and snow packs.
2. There will be a temporary increase in water resources, also contributing to the risk of more intense seasonal flooding and glacial lake outburst floods.
3. Eventually, the ice will melt completely and there will be an extreme water shortage crisis.
4. Climate refugees will seek water and food stability in mass migrations.

The Story Map presents the ways and places in which all of these steps are already occurring.

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1. Increasing temperatures result in rapid and widespread melting of glaciers and snow packs.

Glacial retreat has only been studied extensively in Nepal since the 1970s, but in just the last 50 years, the changes are drastic.

>>See online section: Glaciers of Nepal, 1980-2010<<

The following images depict the development and melt of glacier AX010 in Shorong Himal in Eastern Nepal from 1978 to 2004:

![Image of Glacier AX010 in Shorong Himal](image)

*Figure 3: Development of Glacier AX010 in Eastern Nepal 1978, 1989, 1998, 2004, from a to d*

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The village of Chongur relies on glacial melt to irrigate fields and provide drinking water.

Figure 4: Metok on the roof of her cousin’s home in Chongur, behind her lies the snow cap that provides water to the village

Metok (above), who was born in Chongur, says she remembers when she was young, the snow and ice coming down to the edge of the valley. Today, the farthest-reaching point is isolated to the very peak of the mountain.

Metok's cousin, Gyureme, has lived in Chongur since birth. He says that there are no water shortages now but believes that in ten or so years there will be no snow cap left on the mountain.7

This sentiment of current comfort but increasing anxiety for the future was also present in the village of Kagbeni, where many people expressed that "there are no problems with water here." This comfort may be short-lived however. Uphill from Kagbeni, the snow and glaciers are rapidly disappearing and will one day fail to provide for the villages below.

Concern for the future reliability of water in this region is highly justified, however. Residents of Kagbeni only have to look to their close neighbors, Lupra and Tiri, to see the effects of an increasingly irregular and unreliable water supply.
2. There will be a temporary increase in water resources, also contributing to the risk of more intense seasonal flooding and glacial lake outburst floods

![Figure 6: Chunks of soil collapse onto the river bed in Lupra](image)

The village of Lupra sits along the Panda Khola river, meaning "mad river" in the local dialect. Villagers report that every summer for the past four to five years, there have been intense floods which cover the entire river valley with a perilous mixture of water, mud, debris, and boulders. The result is that with each successive flood event, the raging waters sweep away the fragile banks where Lupra’s most fertile agricultural fields are located.

In addition to disappearing fields, precious apple trees and even a few homes are now at risk as the water cuts away at the village.
3. Eventually, the ice will melt completely and there will be an extreme water shortage crisis.

In Tiri village, residents are experiencing the worst of both worlds: long periods of water shortages followed by a short, intense flood in the summer months.

Tiri is located on the west side of the Kaligandaki River, where the mountains feeding springs do not have the same ice cover as on the East side.

![Image of water collection pond in Phalyak]

*Figure 7: Water collection pond in Phalyak*

To combat unpredictable water supplies, the villages of Lower Mustang each maintain their own series of water collection ponds and an intricate weaving of pipes and tubes which connect houses and public taps to the reservoirs.

This is a temporary solution, however, as villagers in Chongur acknowledge that their water will likely not last many more years.
4. Climate refugees will seek water and food stability in mass migrations.

Gyureme also lamented that now people are moving out of the villages of this valley to the cities of Pokhara and Kathmandu to have more stability.

"People [in the village] are aware that the snow is melting, so they are okay with moving."\(^8\)

In Upper Mustang, where natural springs have dried up, people have been migrating down to Lower Mustang or the cities of Pokhara and Kathmandu for many years. Kami Gurung of Ghey village says, “After all this, staying back in the village is like waiting for death.”\(^9\)


Concluding Thoughts: A Challenge to Act

Many of the people I spoke with in the villages of Mustang expressed the sentiment that they felt their needs were being asked about but not acted upon.

In Tiri, for example, residents lamented that NGOs would come in to interview villagers about how they were coping with water shortages, but then leave without offering solutions, or would provide solutions that were misled and failed after a short time.

I therefore feel a sense of responsibility to encourage some type of change-making as a result of my project. Personally, I pledged myself to a list of environmental goals that are quantitative and that I can hold myself accountable to. For example, eating vegetarian six days per week and cutting out all dairy milk.

For those reading and engaging with this project, I challenge you to make similar goals toward more sustainable lifestyles. For one, the biggest positive impact you can make is by adjusting your diet to include less meat and dairy and include more local and in-season produce.

**Beef has the biggest climate impact**

Greenhouse gas emissions per kilogram

![Graph showing greenhouse gas emissions of different food products](source: Poore & Nemecek (2018), Science)

In this report from the BBC, even plant-based products with the highest environmental impact do less damage than the lowest-impact animal products.

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As students, we can also encourage our institutions to do better. We can push for campus-wide composting, reusable to-go containers in dining spaces, and look to invest in renewable energy sources on campus.

**Average warming (°C) projected by 2100**

![Diagram showing average warming projected by 2100](Image)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>If countries do not act</td>
<td>4.5</td>
</tr>
<tr>
<td>Following current policies</td>
<td>3.5</td>
</tr>
<tr>
<td>Based on current pledges</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: Climate Action Tracker, updated November 2017

In the past, diagrams and models such as the one above were dismissed as unnecessary panic buttons. Today, their message needs to be spread widely and loudly. Real, dramatic changes need to occur, and they need to begin today.

Understandably, it is difficult to ask people to change a way of life. But if we keep in perspective the lifestyle changes that the people of Mustang have been forced to make, our voluntary ones should be a no-brainer.

**Appendix**

StoryMap Website Link: Please contact SIT for a link to the Story Map, or the author, at ecarlson117@gmail.com

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Bibliography


Suggestions for Future Research

Students interested in environmental studies, global development, and/or GIS could seek out an internship or research connection with the International Center for Integrated Mountain Development (ICIMOD) based in Kathmandu. Their organization works to study both environmental issues and the ways in which they are affecting the people of the entire Hindu-Kush region.

Possibilities for furthering this research would be to investigate the effects of climate change in the lower elevation areas of Nepal or India. It would also be an impressive and noble undertaking to organize some type of action event, such as a neighborhood cleanup or fundraiser for environmental issues.

In Lumbini, Nepal, Venerable Metteya is working hard to push for sustainable development in the increasingly-visited pilgrimage destination. Conservation and education are his main foci, and he would be an incredible contact for those interested in studying sustainable development.

Finally, the StoryMaps software is very simple to learn to use and would be an interesting vehicle for research projects of any topic. There are multiple templates to choose from depending on the type of story one wants to tell, and they offer a unique way to engage a larger audience.

*Figure 10: Me with some super neat, super old seabeds in Mustang*