

Enriching college students through study abroad: a case of Nepal Field Experience

Part 3

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Abstract— With a view of providing an unsurpassed opportunity to college students, who are mostly from Louisiana, in gaining a comprehensive understanding of Global Climate Change issues, we completed the first Nepal Field Experience Pilot Study Abroad from May 21–June 8, 2019. A total of fifteen students from the University of Louisiana at Lafayette, Louisiana, USA, and one graduate student from University of Arizona, Arizona, USA, participated in the program. Students examined and documented the effects of climate change impacts on agriculture, water resources, wildlife, local communities, forest resources, and other ecological and environmental settings of the country. They identified various climate change mitigation and adaptation measures that had been implemented and noted gaps between policy measures and ground realities. Research topics selected by the students included the following: climate change impacts on wildlife, water pollution, structural geology of Nepal, changing rainfall patterns and adaptation, climate change and agricultural production, geology of Kathmandu valley, air quality of Kathmandu valley, changing hydrology of glaciated landscape, climate change and geohazards, emerging diseases and pests on agricultural crops, climate change adaptation by local communities, green infrastructure and climate-smart technologies, climate change impact on drinking water sources, the roadside geology, and emerging diseases, parasites and zoonotics. Each student completed their individual research project, synthesized the results, and presented to local stakeholders in conference organized by a nonprofit nongovernmental organization, Asta-Ja Research and Development Center (Asta-Ja RDC), Kathmandu, Nepal. Findings of the study reveal that Nepal is experiencing huge impacts of climate change in multiple fronts including atmospheric conditions and snowfall, temperature rise, occurrence of droughts and flooding, changes on monsoon pattern, emerging diseases and pests on crops and livestock, and declining drinking water sources. Environmental pollution, especially the

air and water pollution and waste management, was very serious affecting public health, aesthetics, and even the tourism of the country. In order to reverse environmental degradation and enhance climate change adaptation, immediate implementation of effective, comprehensive, coordinated, and well-thought-out climate change adaptation and environmental initiatives are necessary. Nepal Field Experience was a lifetime learning experience for the students.

Index Terms— Study Abroad, Global Climate Change, Environmental Quality, Geology, Nepal

I. ENVIRONMENTAL EDUCATION AND COMMUNITY AWARENESS

Tribhuvan University is the largest university in Nepal with an environmental science program that focuses on mainly on the impacts of climate change. Few indicators of climate change include the melting of glaciers, drying springs, shifting rainfall patterns, and temperature rise. Similarly, Kathmandu University's environmental science program offers an environmental engineering program. Students at Kathmandu University specialize in climate change, wildlife, air pollution, glaciated landscapes, environmental remediation, and GIS.

Community awareness is critical for tackling air quality problems of Kathmandu Valley. Providing environmental quality education to the youth is essential. The youths have to understand the serious impacts of living in these conditions and strive to make a change, otherwise no change will ever come. Educating communities on environmental issues is very important. Without educating the citizens, they are left at the will of the government, whose actions do not always reflect the



needs of everyday Nepali people. As an example of public education, a group of school children were protesting against air pollution in Swayambhunath temple (Photo 12). All of the protesters were wearing facial air-masks that read “beatairpollution” and holding signs with pro-environment statements on them. Along with many other NGOs, the Asta-Ja Research and Development Center (Asta-Ja RDC) has played a large role in increasing the climate change adaptation by communities, especially farmers, so that they can better use their limited resources.

PHOTO 12. SCHOOLCHILDREN PROTESTING AGAINST AIR POLLUTION IN KATHMANDU.



Source: taken by the co-authors of this article

Asta-Ja activities include monthly seminars on environmental community awareness, drinking water projects, organic vegetable production, disaster management, climate change adaptation studies, and community nutrition and health. People in the Nagarkot area were aware of climate change, how human activity is polluting the area, and how that hurts their communities and local wildlife.

II. PROBLEMS ENCOUNTERED, SKILLS ACQUIRED, AND EXPERIENCE GAINED

A. Problems encountered

Nepal was very different from the United States in a number of ways. Students were required to adapt and be more flexible in a lot of areas. Even though it was a temporary stay, they still needed to adapt to the many differences, such as customs, appropriate manners, food, travel, and the accommodations, whether it was convenient or not. Lots of last-minute changes made the trip difficult, though it is understandable that many things that we plan are difficult to implement and changes are necessary. Air travel management was very stressful. The way our travel agency handled many unanticipated changes was unacceptable. The bus choice was not optimal. It is important to consider whether multi-hour bus rides are worth the field experience. The lack of good air conditioning and uncomfortable seating was a problem. The multiple-hour bus rides were quite uncomfortable, exhausting, and distressing. The bus rides to the watersheds were too long and difficult. Dust exposures caused our faces to turn black after a day riding

in the van from all the dirt in the air. It is important to include periodic rest/preparation days throughout the trip and/or optional days. Lack of rest was a big problem. Waking up early and going places all day is physically and mentally exhausting. Some free days would be nice to spend as students. Similarly, food management was an important issue because the time for field work was compromised by stopping for lunch. The process of ordering, cooking, eating, and paying caused each meal to take around two hours. The range of topics was too broad to be effectively or efficiently addressed. Any one topic could have served as the topic for all the interns which would allow a more focused and streamlined program. We lost one day due to a strike, but planning for an event like that is nearly impossible. Time was limited for students to obtain geology-related information.

B. Skills acquired

Critical thinking and analysis of information was emphasized each day. Various environmental issues were discussed daily, and students were encouraged to think beyond what was obvious and to strengthen observational and reasoning skills. Interacting with and understanding that the people of Nepal experience hardships on a daily basis was emphasized. Students were trained for field observation, note taking, and formulation of environmental questions that should be asked to when interviewing local people. They also learned identifying different grades of metamorphism in the field, assessing strike and dip of an outcrop, and comparing nearby outcrops to understand land shifting. Similarly, developing a properly-formatted research paper was a good skill acquired. Students learned the importance of gathering and preparing all possible relevant background information before going into the field to make the most of the opportunity. One of the team member states:

“I feel that the time I spent discussing my research topic with the people of Nepal was time well spent, and my knowledge of the matter grew in a way it could not have if I were to just have read scholarly articles. I was able to gather quotes, photos, videos, and other forms of qualitative data that helped to build upon my original hypothesis.” Aubrey Mann

Communication skills were essential for program success. Exposures to different languages also encourages forming an interpersonal relationship with different people because it requires more effort. This trip taught the value of connecting with people, working in groups, and healthy/productive communication. Public speaking is another important skill required, especially when the audience is interested in the topic. Time management was another skill acquired.

C. Experience gained

We had to analyze our surroundings and think critically about the relationships between the different things we saw in the environment. Application of the knowledge that was previously known to the surrounding environment was important aspect of the program. Being open and interacting with locals while discussing current environmental concerns in

Nepal was also a challenge. Speaking at the Climate Change and the Environmental Quality: Challenges and Opportunities seminar offered practice conveying large amounts of information in a concise manner, helping to develop a full report. Relevant quotes from the participants include:

“I had to speak in front of an audience at a seminar put on by Asta-Ja Research and Development Center. It is something I never had to do before. It is something that I need practice doing, but it is the first time I have been exposed to that experience. Teamwork and collaboration was another skill I needed to use almost on a daily basis when I was there. Not only on safety, but also when I had to collaborate with my partner when we were working on our PowerPoint presentations.” Allison Higdon

“On this trip, I was able to understand what effects climate change has on us. Climate change has a huge impact on changing river flows, which will affect low flows, drought, flood, and sedimentation processes. Climate-dependent hazards that arise trigger rapid-onset disasters. These disasters include cyclones and other windstorms, landslides, avalanches, and floods. After the first-hand encounters and talking to the locals in Nepal, it is clear to me that climate change has emerged as a key driver that exacerbates the risks of natural disasters in Nepal.” Brittany N. Broussard

“Being able to see watershed first hand and how the impacts of actions taken upstream affect those living downstream was eye opening. This experience answered a lot of unanswered questions I had whenever I was learning my curriculum. I feel I was blessed to have this opportunity and would highly recommend that every environmental science student experience this study abroad opportunity.” George Bailey

“To our surprise, the Nepalese government does not implement provisions relating to the environmental quality. Locals in Nepal would throw their trash into the streets, in the rivers, or just burn their trash on the side of the road. Burning trash only adds to the air quality issue that Nepal is currently facing. There is also very little regulation as far as emissions from vehicles, which is large contributing factor to the poor air quality.” Hali Corwin

“We had an opportunity to talk to the class and teachers protesting against the air pollution. It was a heart-warming experience. No matter the age, it is important that everyday Nepali citizens get the environmental education they deserve.” Aubrey Mann

“By traveling to Nepal, I learned how best to conduct prior research, take detailed notes, and search for important questions to ask on-site. In the weeks leading up to the trip, I plundered through around 100 research articles related to my topic and recorded info in my field notebook so I would know what I was looking at and what questions to answer when I was in Nepal. It became an irreplaceable part of my trip as it helped me to bridge the gap between reading about the country versus actually seeing it first-hand.” Andrew Braun

Meetings with government officials and engaging in conversations with locals were extremely insightful and allowed the group to be able to have a better understanding of the climate and culture of Nepal. Similarly, the Jeep safari in

Chitwan National Park was certainly a great experience. For many, seeing nature closely like this would happen only through documentaries and pictures. Observing it first-hand was certainly a memorable lifetime experience. Experiencing the cultural show at the Tharu Cultural House in Chitwan was phenomenal. It gave better appreciation for the history of the area. More time in Chitwan to explore shops and cafés would have been great. The village was calming and tranquil, unlike the bustling and dirty streets of Kathmandu. A big benefit was being able to see such a vast amount of landscape in such a short amount of time

III. STUDENT'S STATEMENTS

D. About learning

“My concept of environmental problems was focused on problems facing the state of Louisiana or the United States as a whole. Being able to go to a country such as Nepal it opened my eyes. The experience made me realize that environmental protection deserves to include the world as a whole not just the local environment in which you live.” George Bailey

“It was because of this trip that I now understand how to conduct qualitative research studies, I feel more confident working in teams, and I have a clear view of my future as an environmental scientist. I look forward to seeing how this program grows and develops over the upcoming years and hope that future students gain just as much, if not more, as I did.” Aubrey Mann

“This Field Experience taught me the importance of communication. Constantly along our journey Dr. Poudel bridged the language gap and was able to obtain information from local citizens that we might not have had access to. This information is not the information that you can find in scholarly articles or from statistical analyses of massive data sets. This information was emotional and qualitative, and this experience taught me that qualitative data is just as important as quantitative.” George Bailey

“Climate change will make many of Nepal's pre-existing problems like poverty and malnutrition much worse and more widespread. People need to start making drastic changes. Worldwide, our governments need to commit to reducing greenhouse gas emissions. It is exceedingly important that global warming is slowed, because it is destroying environments all over the globe, especially in fragile places like Nepal. While in Nepal, I saw these consequences first-hand. Farmers are already running out of water for their crops and livestock. It is upsetting to see people facing these problems and not be able to directly help them. I think it is important to increase knowledge and awareness about the changing climate so people can learn to adapt and prepare for the future.” Holly Heafner

“I got an opportunity to talk to a Sherpa who has been hiking around Nepal for over 10 years. He stated how the mountains have changed so much in the past five years. They went from snowy and white to muddy and grey. He also mentioned that

many famous hiking trails are having roads put through them. A quarter of Nepal's gross income comes from tourism. If the landscape continues to decline in appearance, foreigners will be less likely to visit the country and Nepal will be in worst financial shape then they are now. At the beginning of the trip, I thought climate adaptations had to be big, fancy projects, but climate adaptations can be as simple as walking to a river farther from your village or scaring of animals from your crops." Brandon Stelly

"This study abroad program highlighted differences between Nepal and America in infrastructure, lifestyles, and education. The different practices regarding water management and lack of enforcement of environmental policies was overwhelming. It helped my understanding of why Nepal is having the water issues it has despite the increasing amounts of research and implementations like rainwater harvesting. Unfortunately, people that have the knowledge to make positive changes to help this nation are travelling abroad for better opportunities, leaving Nepal with an education problem regarding environmental issues." Katie Eddings

"On the trip, working with other students from different research backgrounds was important in our understanding of Nepal's geology and environmental response to global climate change. As a geology student, I spend most of my time looking at rocks and interpreting past environments. I happened to learn quite a bit about what this change looks like in real time, primarily from the prior research of my peers and from testimonials from locals about how much the air quality, water quality, weather patterns, etc. have changed over the past 30 or so years. It gave me insight into a branch of science I am not entirely familiar with, and it was very intriguing." Andrew Braun

E. Lifetime experience

"I cannot express in words how thankful I am to have had this opportunity. It was an experience of a lifetime, and one I will forever cherish. While I learned so much about the culture, economy, environment, and the geology of this beautiful country, I also learned a lot about myself. This experience forever altered my perspective on life and the world as a whole. My mind has been stretched beyond its original dimension and it will never be the same again. It was incredible to experience everything in this wild and beautiful country first-hand and to realize how little space I take up in the world. This experience definitely changed my life for the better, and it was the best form of education I have had thus far regarding people, environment, geology, culture, economy, and many more." Allison Hingdon

"We were immersed in local traditions, such as dancing with locals in the Chitwan and while visiting the religious temple in Pokhara. A new appreciation for life and what we have in the United States is one of the biggest take away points from the trip." Hali Corwin

"Travelling to a third world country was an indescribable experience filled with triumph and tribulation and this trip will leave a lasting impression on me as long as I live. This trip has

undoubtedly changed my life for the better with having a new insight to things." Brittany N. Broussard

"This trip was a learning experience I will value for the rest of my life, and I hope to be able to do more things like this. The combination of qualitative and quantitative data made this experience more of a hybrid between environmental science and anthropology, which is important as the two are not and will never be separated from each other (mutually exclusive). People are by far the biggest factor to climate change, human impact is always important, and human impact is based on how we are raised and where we are raised." Aubrey Mann

"Prior to coming to Nepal, I had never left North America. I knew as soon as the trip was announced that I could not pass up this opportunity. I am very glad that I have been able to go, not only to a new country or a new continent, but to be able to explore more about the planet I am a resident of, seeing different cultures and taking part in customary experiences rather than reading about it in an edition of National Geographic or watching it in a documentary." Andrew Braun

F. Cultural shock

"I experienced a huge culture shock. With the majority of Nepalese being either Hindus or Buddhists, everyone dressed very different and had very different customs than Americans. There was a drastic change in food for me as well. Cow was not to be eaten in this area due to their belief system. We were also unable to eat any raw produce due to their water." Brittany N. Broussard

G. Absolute favorite

"My absolute favorite memory from this trip was getting to eat lunch at Dr. Poudel's home." Layken Willis

"I wish we could have seen more temples as a group and had their histories explained to us. I loved visiting the monkey temple. During my time in Nepal, I visited the tourist district of Thamel multiple times and found it endlessly entertaining. We ate good food, shopped, and listened to live music. Our visit to Dr. Poudel's family home was so delightful, if possible, I think this stop should always be included in the program." Holly Heafner

"On the last full day in Nepal, a few of us made our way to a tea shop in eastern Jawalakeel that had been closed every other time we intended to visit. The tea shop owner, Kiran, was very welcoming and informed us about a massive festival occurring later that afternoon. He invited us to come and watch it with him from the top of his apartment building. From the roof, we were able to see the streets become completely choked with thousands of people, pulling up to 100-foot trees in giant chariots with nothing but rope and their own combined strength. I had wanted to observe some sort of Nepalese cultural festival or something of the sort, and this was the perfect way to end our visit to Nepal." Andrew Braun

H. Other

"It was an interesting opportunity to compare two places, Louisiana and Nepal, which are along the similar latitude but

they have dramatically different elevations.” Aubrey Mann

“Through it all, I never felt threatened because safety was always the main concern of our mentors.” Timothy C. Martin

“Overall the experience was good and was a well worth it trip. It could have been better planned and organized but this was expected from a pilot program.” Luke Immel

“The study abroad trip in Nepal was an incredible experience for all involved. In my case, I was able to combine my graduate field work at University of Arizona with ULL's climate change and agriculture studies. The professors, the students and the flexibility for me to join in all made for an insightful look into the world of international development and environmental advocacy. Dr. Deux and Dr. Poudel are really starting something special in Nepal, and I for one would relish the opportunity to be involved in any way possible going forward. I can only hope that ULL students will take advantage of this amazing opportunity in the coming years as it grows.” Avery Baker

IV. RECOMMENDATIONS FOR FUTURE IMPROVEMENT

Based on our field experience, we make following recommendations for future improvement.

- 1) Discuss background information about each site prior to arriving to the sites/destinations. Sufficient time for collecting relevant data in each site is necessary. There should be coherent framework and more specific guidelines is necessary for effective research and reporting on the various subjects of the study. Have a limited scope of the study and have collaboration with other interns on a single research topic.
- 2) Have more hands-on research and be out in the field. Dhobi Khola watershed provided us an opportunity for hands-on research with watershed survey. Four different sites in the watershed were studied in terms of animals, plants, water quality, and structure. More hands-on sites would have helped in improving the skills learned in the classrooms.
- 3) Include some trekking because Nepal is known for their beautiful trekking experience. People travel from all over the world to hike some of Nepal's famous trekking trails. Trekking can make the experience more hands on and personal for the next group of lucky individuals who are able to participate in this study-abroad experience. Include field activities to generate relevant data on the research topic so they will rely heavily on the literature for their research.
- 4) Decrease class size so that students can get more on-o-one experience. More cross-disciplinary between geology and environmental science field activities would make the participants more engaged. This trip should be restricted to upperclassmen who have the prerequisites met. If a student has not had the proper courses taken already, they should not be allowed in the trip. Splitting geology and environmental science students into two groups will be another possibility.
- 5) The air quality of Kathmandu was a big issue. Being more informed as to what to expect regarding the air quality

would have been beneficial. Drastic measures need to be taken in Nepal to implement environmental protection legislation. It would also been nice time to spend less time in Kathmandu and more time in Pokhara. Pokhara is a beautiful city to visit, the air quality was better, and we overall would have liked to spend more time here.

- 6) Stay in a single city and heavily research the area over the course of the two weeks rather than hopping around from place to place. By staying in one general site, this would allow students to be more focused and familiar with the things going on. Focusing in only two or so areas would allow the students to get more specific topics and be able to collect data on those topics more readily. Another possibility is to break down the student topics into small groups of roughly two or three people rather than solo topics. This too will allow more minds to come together on a singular idea, which in turn could allow them all to get a better understanding of a topic instead of having a single person trying to process information of a broad-range topic in a two-week period.
- 7) Make the trip more than two weeks so that we can stay longer in an area, enjoy it, and not be rushed to leave so early to drive for hours to the next place. The program can be stretched out to 4-6 weeks. It was really exhausting and stressful to have to move around so much and not being able to get too comfortable in a certain place. The program would run smoother if there wasn't as much travel time so that more time could be spent in each location. Everyone will benefit from the trip being at least a week longer or having better time management.
- 8) Leave out the safari part because the views are hindered by elephant grass and it is reported that the winter makes for a better experience.
- 9) Provide support to NGOs such as Asta-Ja Research and Development Center (Asta-Ja RDC) and other grassroots-based organizations for community awareness and the implementation of pollution control strategies and practices.
- 10) It will be very helpful to have a binder with information explaining each of the places that the students are visiting, which could be studied before visiting the places. It will be helpful if students know ahead of time what they are going to do and where. In addition, it would be better to have a simple daily assignment to make sure that all students were engaged with the information they took on that day.

V. CONCLUSION

Impacts of climate change in Nepal are worrisome because Nepal does not currently have the infrastructure to handle such an abrupt increase in sudden rainfall, and one of the biggest questions currently being asked is, “How do we adapt in these changing conditions?” There are two important aspects of adaptation: education through community awareness and funding. Without proper community awareness and education, climate change initiatives fail. For example, Dhobi Khola was walled on both sides for flood control in this study and sewage

was supposed to go through the treatment facility. By educating people, trash could be collected in one place, sewage dumping to the stream could be stopped, and the rock walls could be maintained better. With proper funding, climate change adaptation project could be implemented. Poor infrastructure in the city with the lack of proper solid waste and waste water disposal is a big problem and contributor to the transmission of diseases. The presence of standing water and solid waste becomes a breeding ground for parasites, bacteria, and vectors that transport diseases. Another anthropogenic issue is rapid development and expansion of urban areas into previously undeveloped areas. As these undeveloped areas become developed, the transfer of disease-carrying vectors come along with it. Increasing temperatures due to global warming and climate change is creating such an environment and is allowing diseases to travel to new places and thrive. Climate change can affect the rate at which the parasites and vectors multiply, as well as the rate at which the diseases are transmitted.

Kathmandu is dealing with both water shortages and water pollution issues. The continued effects of climate change are expected to exacerbate these problems. A large part of these issues is due to a lack of or no infrastructure in place to manage the water effectively. While there is some effective green infrastructure (like the roadside drains), they are underdeveloped or not suitable and have a negative effect on the ecosystem. Improving the drains by connecting them and adding treatment and storage facilities, as well as improving the retaining wall by adding vegetation mats to protect them, could reduce the water-related issues in the Kathmandu Valley. Retaining walls built deep in the stream can be added, along with vegetation mats with native plants along the base of the walls. It would not only provide protection from erosion, allowing the walls to last significantly longer, but assist in flood protection as well. The vegetation would slow and absorb some of the water.

As a pilot study abroad, this was a very successful program. The trip was executed very well. Hotel accommodations, the local support system, the selection of research topics, and the sites for field investigation were outstanding. Some of the key areas where the program needs further improvement include air and road transportation, more free time for students, increasing the general level of class engagement on field activities, group meetings, recording field notes, and stipulating rules and regulations. In addition, general preparation of the class for the field study is in need of improvement, as well as more clearly-defined research activities in the field and proper allocation of time for exposure to local culture, tradition, architecture, and society, all of which will benefit the overall enrichment of the student participants. Preparation for the next field experience will start soon after the beginning of the academic year. By the end of the trip, we all had the pleasure of presenting our topic of study at a conference organized by Asta-Ja RDC. This opportunity allowed us to be recognized in the scientific community in a more professional setting. Field Experience Study Abroad program is both an honor and a privilege for college students. Field experience taught students the value of research through a cultural lens and the reality of how limited

some resources are in most of the world.

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