

Sophia Parker
Ankeny High School
Ankeny, IA
Nepal, Climate Volatility

Nepal: The Devastating Effects of Climate Change in Southeast Asia

Nepal is a country that is home to some of the highest peaks in the world, as well as one of the highest poverty levels. The nation is located in South Central Asia, bordered by India and China. It covers an area of about 147,181 square kilometers and has a population of approximately 29,717,587 people (Central). Of those civilians, almost 31% of them are currently living below the national poverty line and about 6.4 million of them suffer from food insecurity (Kilpatrick). It faces a wide variety of natural disasters and struggles to thrive as a country because of it. Rising temperatures, flooding, and droughts are some major climatic events occurring in Nepal that affect its food security and its ability to nurture healthy lives for its people.

Nepal is a small country, approximately the size of the state of Iowa (“Nepal” *CultureGrams*). While it isn’t very large, it has some of the most diverse land structure and plant life in the world. It houses four different land types, ranging from low-lying fertile belts to some of the world’s highest mountain peaks. Those mountain ranges cover almost 75% of the country’s total land area, leaving only 14,207 square miles to provide the basis of an entire country’s economy. The first region of land is called the Tarai. It is near the Indian border and most of the farming occurs here. It stretches between sixteen and twenty miles in width. The southern section of this area which connects to the Churia Range foothills tends to be more marshy, causing malaria to run rampant. This area is the most susceptible to the effects of climate change, due to its low elevation. The elevation level increases the risk of floods during the rainy season. The Churia Range itself is not highly populated, sitting at an elevation of 4,000 feet. Across many miles of large basins, often cleared for cultivation, lies the Mahābhārat Range. The climate in this region ranges from tropical to warm. A chain of mountains with elevations varying from 8,000 to 14,000 feet high and 50 miles wide run in between the Mahābhārat Range and the Great Himalayas. Valleys and basins lace their way through the sides of the mountains. The Great Himalayan Range contains the tallest mountains in the world, including Mount Everest. This region is completely uninhabited, with the exception of some sporadic villages nestled high in the peaks. The climate in this area ranges from cold to arctic (Karan). With the immense land variation that the country possesses, finding empty land with fertile soil and good growing conditions is practically impossible. Because of this, the average farm size in Nepal is only seven-tenths of a hectare, which is comparable to the grassy area inside of a typical high school track. A farm this size may produce just enough food for a family to survive on, but not enough income to rise above the poverty line (“The Trouble”).

Family is a core component of Nepalese culture. In urban areas, families typically have between two and three children; in rural areas, families might consist of six or more children. Children are expected to care for and live with their parents for most of their lives, even after they are married. Oftentimes, aunts and uncles live in the same house as well. This custom encourages strong family bonds and promotes tradition, as people have been living like this for thousands of years. The type of home that families live in is dependent upon whether they live in the city or the country. In urban cities, houses resemble those in

America but are slightly smaller in size. They typically have two to three bedrooms and are made of brick, stone, wood or cement. Many homes have indoor plumbing and have space heaters and ceiling fans to regulate temperature. Rural homes are often made of stone, mud, bamboo, or wood. They may have a room for sitting, a kitchen, and a room for sleeping. The whole family shares each of these rooms. Homes in the country often lack running water, so it must be carried from a local tap. Nepal lacks a strong infrastructure, which has proven to create more damage during natural disasters. Nepalese society is dominated by males; they hold more power over women and are expected to earn money for the family. Because there is a deficit of steady jobs in Nepal, the males of the household are often forced to migrate to India and other neighboring areas for work. They can be gone for up to eleven months out of the year. While they are away, women often have to make up for their absence (Kilpatrick). Women are typically only responsible for maintaining a household; in rural areas, they may work in the fields (excluding plowing) or fetch water and food for their animals (“Nepal” *CultureGrams*).

Nepal is heavily dependent on agriculture, both economically and culturally. Agriculture provides up to one-third of Nepal’s Gross Domestic Product and 80% of Nepalese civilians rely on it for survival (“Country”). Because of this strong dependence, even the smallest climatic disturbance can prove to be detrimental to the entire nation. When disaster strikes, which is occurring more frequently, farmers are greatly impacted. One reason why farmers are so vulnerable to the impacts of the climate is that most rural families eat and live off of what they grow themselves. A typical diet in Nepal consists mostly of rice, normally served with a lentil dish and cooked vegetables. In areas with high elevations and large poverty rates, a corn or millet mush may also be served. By simply looking at a daily meal, the reliance on agriculture can be noticed quite easily. Staple crops grown in Nepal such as rice, wheat, and corn are vital providers of most nutrients a family receives in a day; this means that when natural disturbances occur, rural families’ means of survival are ripped away from them (“Nepal” *Countries and Their Cultures*). This forces them to limit their food intake or to rely on food aid if it is easily accessible (Synnott). Situations like this are common occurrences in Nepal, just as they are in many other developing countries in the world. In fact, two out of every three people in Nepal suffer from food insecurity at some point during the year (“Nepal” *Feed The Future*). A lack of access to a steady supply of nutritional food can cause low body weight, stunting, and malnutrition in children, all of which limit growth and proper development. In fact, 49% of Nepalese children between ages zero to fives are underweight (“Food”). Without a healthy diet to fuel them, a child’s educational potential is lowered; without an education, children are less likely to escape the cycle of poverty.

Climate volatility and climate change are major issues impacting food security in Nepal today. The country is extremely disaster-prone and ranks fourth on the Climate Vulnerability Index (*ReliefWeb*). One reason why this ranking is so high is because of glacial lakes. Nepal houses about 10% of dangerous glacial lakes in the world. In fact, three lakes are in critical condition today. The increased rate of glacial melting poses a danger not only to the families living in the mountains near the lakes; these lakes will have an impact reaching all the way to Bangladesh (UNDP Nepal). Climate vulnerability sets Nepal at a disadvantage when it comes to agriculture because it becomes an unreliable source for food; however, many people still heavily rely on it for survival. A changing and warming climate only adds to the issue of food insecurity. According to the Central Bureau Statistics of Nepal, “over the last decade, almost 30,485 hectares of land became uncultivable due to climate-related hazards” (*ReliefWeb*). If one family has a farm that is only seven-tenths of a hectare (on average), that means that almost 43,550 farms were

destroyed. In addition, atmospheric temperatures have risen 35.24 degrees Fahrenheit in the past 31 years, which is faster than the global average. These temperatures have led to the shrinking of glaciers in the mountains which could lead to more flooding and reduced amounts of water in rivers (“Country”). Warmer temperatures also encourage the breeding of certain insects which can damage crops. These insects don’t only pose a threat to agriculture; they also threaten the health of humans. Vermin, such as mosquitos, can carry harmful diseases like malaria, dengue fever, and Japanese encephalitis. Other climatic impacts in Nepal include the irregularity of monsoon and other precipitation patterns. The monsoon has one of the largest effects on agriculture because it provides between 75% and 80% of the yearly rainfall that Nepal gets (Synnott). When the monsoon does not produce enough rain, droughts and soil erosion begin to occur. Droughts leave the soil extremely dehydrated and without the vital nutrients the crops need to grow. When the crops are unable to grow, their roots do not sink into the soil. The roots of plants help hold the soil together and without them, the soil begins to erode and the nutrients present within it are stripped away. However, too much rain produced by the monsoon can also become hazardous to agriculture. Large amounts of rain can trigger landslides, mudslides, and extreme flooding. Landslides and mudslides wipe out homes and crops as well as the nutrients present in the soil. Because the weather patterns are becoming so difficult to predict, farmers are unable to take the necessary precautions to protect their crops. One example of this occurred in 2017 when a flash flood in southern Nepal caused the loss of \$57 million (US) dollars worth of crops and took the lives of many civilians (*ReliefWeb*).

The Nepalese government is currently working to address the issues of food insecurity and climate volatility within the nation; both domestically and on a global scale. In 2015, the country signed the Paris Agreement in an effort to reduce carbon emissions and limit the effects of climate change (Climate). The nation also works with foreign aid groups to help combat hunger and climate change. Groups such as Oxfam and Mercy Corps help distribute food, weather-resistant seeds, and more efficient irrigation systems to the Nepalese people and also educate them on different farming techniques and technology. These groups produce effective results and provide their own funding. If the United States’ government allocated more funds for the aid groups, more Nepalese people could receive the help they need. Despite the progress made by these organizations, the Nepalese government has actually decreased funding for the Ministry of Agricultural Development (MOAD) which is responsible for the growth of agricultural programs and the development of new technology. In fact, MOAD’s budget only makes up 1.1% of all government spending; their budget only allows them to spend \$105 million (US) dollars (“The Trouble”). In comparison, the United States Department of Agriculture has a budget of almost \$140 billion (US) dollars (“FY”). Without proper funding, no agricultural improvements can occur. While farmers wait for governmental intervention and foreign action, there are ways that they can take action for themselves.

One change that farmers can make is to reduce the amount of tilling. Tilling is the plowing and overturning of soil to prepare it for the planting of new crops. It is done primarily to loosen the soil, mix up nutrients within the soil, and to bury weeds. While tilling is beneficial to a certain extent, it is not a sustainable practice for large fields. Over time, tilling actually damages soil structure and the amount of water it can retain. Because the soil is broken apart so often, air pockets are created. This limits the ability to hold in nutrients and maintain form. If farmers did not till their fields, the amount of soil erosion and evaporation would be reduced. Without air pockets, moisture is trapped in the ground and can transfer water into the roots of plants. This moisture helps hold the soil together, thus decreasing the amount of

erosion (Gudkova). In addition to increased stability, tilling can create richer soil as well. This is because leftover nutrients from previous crops will remain in the ground and can then benefit the new crops. With nutrient-rich soil, fields will be able to produce larger amounts of higher quality crops (“Alternative”). Tilling is also extremely labor-intensive so eliminating this process would reduce the amount of work in the fields and stress on farmers (Gudkova).

One other agricultural area that could be improved is seed and grain storage. Many farmers in Nepal today are using the same seeds for multiple generations. These seeds have not adapted to a changing climate and do not produce quality crops because of it. The construction of seed and grain storage bins could help solve this problem. This will help farmers store the best seeds from each season to use in later planting seasons. As time progresses, the seeds will be able to grow and adapt to their changing conditions and become more resilient. In turn, this will produce greater yields of crops.

Another component of agriculture that could be improved is irrigation. Currently, over 76% of farmland in Nepal relies on rain for its source of water (Synnott). As precipitation patterns become increasingly difficult to predict, this is not a sustainable source. Other irrigation systems lack efficiency and solid construction (Gajmer). Instead of using older forms of irrigation, new drip irrigation systems could be installed. Drip irrigation systems start with water in local tanks. A tube extends out of the tank vertically towards the ground. From the vertical tube, another horizontal tube is attached. Smaller tubes branch out from the horizontal tube and run along the lines of crops. Emitters on the branched tubes slowly release water into the soil around the plants. The water is then absorbed by the soil and the roots of the plants. Drip irrigation is more beneficial than traditional ways of irrigation because it releases water directly into the soil, limiting the chance of evaporation or runoff. It also helps save water because water is only distributed to the area of the field that needs it; the soil. Drip irrigation would provide a constant water source for crops, thus reducing the effects of droughts and increasing crop yields. Drip irrigation systems would also provide job opportunities to the people living in the area where it is installed. Men would be able to find local work through the construction and maintenance of the system, meaning that they would not have to migrate to other places for jobs. Additionally, the irrigation system would allow for crops to grow year-round which would provide a more constant, stable source of food. While drip irrigation has many benefits, it also has some downfalls. One major issue is the cost; in the United States, some drip irrigation systems can cost up to \$3,000 per acre. However, new prototypes of cheaper drip irrigation systems are currently being tested in Jordan and Morocco; if they work, the systems would be more easily accessible for farmers in developing countries (Chu).

Climate volatility is a factor that greatly impacts food insecurity in Nepal today. It will continue to get worse in the coming years; the only choice is to learn how to adapt to the changing climate. However, without help, the Nepalese people will continue to suffer from food insecurity; an issue that impacts every aspect of their lives. With larger amounts of foreign aid from different countries and increased advocacy for governmental intervention, citizens of the world will be able to make a difference for the Nepalese. By implementing practices such as drip irrigation, seed and grain storage, and no-till land, the Nepalese people will be able to combat food insecurity from the front lines. Obtaining a stable food source would allow the country to grow and thrive, despite an ever-changing climate.

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