ON THE ROAD TO BETTER HEALTH? IMPACTS OF NEW MARKET ACCESS ON FOOD SECURITY, NUTRITION, AND WELL-BEING IN NEPAL, HIMALAYA

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ON THE ROAD TO BETTER HEALTH? IMPACTS OF NEW MARKET ACCESS ON FOOD SECURITY, NUTRITION, AND WELL-BEING IN NEPAL, HIMALAYA

By

MICHELLE URSULA GROCKE

M.A., University of Montana, Missoula, Montana, 2014

Dissertation

presented in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy
in Anthropology, Applied Medical

The University of Montana
Missoula, MT

May 2016

Approved by:

Scott Whittenburg, Dean of The Graduate School
Graduate School

Kimber Haddix McKay, Chair
Anthropology

Gilbert Quintero
Anthropology

Thomas Foor
Anthropology

Ranjan Shrestha
Economics

Keith Bosak
Forestry and Conservation
The first road to be built into Humla, Nepal has connected this once-remote Himalayan region to a market in China. This dissertation research assesses the impacts of this road on villagers’ food security, diet and nutrition, and subjective well-being, and investigates the link between objective and subjective health outcomes. The primary aim of this study is to decipher whether villagers’ ‘proximity to road’ is the strongest predictor of the aforementioned health outcomes, or whether other sociocultural and economic variables play a more significant role. A mixed-methods approach and a case-control ethnographic research design were implemented in order to investigate this question.

Results from the food security questionnaire indicate that due to easy accessibility and low costs, villagers now supplement their agricultural yields with enriched, processed foods obtained via the road. Although villagers perceive their current food security as being significantly higher than in years past, results indicate that food security levels do not always positively correlate with either ‘proximity to road’ or the harvest season. Nutrient composition analysis indicates that differences in both livelihood tasks and prestige ascription by gender and age yield a high variability in both dietary patterns and nutritional outcomes. These differences are also reflected in the anthropometric data, which show that while a portion of the study population is ‘underweight’, another portion is simultaneously ‘overweight’. Villagers’ subjective well-being, in addition to being defined differently from village to village, has a higher correlation with human capital levels and socioeconomic status than with ‘proximity to road’.

This research illuminates the complexity involved with determining whether the introduction of a road will manifest in positive health outcomes. Using the new road in Humla District, Nepal, as a case study, this research takes advantage of a unique opportunity to study human dietary shifts as they are in the process of occurring. By assessing villagers’ decision-making patterns regarding their food consumption, the overall aim of this study is to gain an in-depth understanding of the dietary sea change that is leaving its mark on the quality of life across the globe.
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Chapter 1
Introduction

‘The difference between a path and a road is not only the obvious one. A path is little more than a habit that comes with knowledge of a place. It is a sort of ritual of familiarity. As a form, it is a form of contact with a known landscape. It is not destructive. It is the perfect adaptation, through experience and familiarity, of movement to place; it obeys the natural contours; such obstacles as it meets it goes around.’

- Wendell Berry, The Art of the Commonplace: The Agrarian Essays

Humla is a remote, mountainous district in the far northwest corner of Nepal, with China (formerly Tibet) bordering it to the north and northwest. For centuries, Humla District had been an epicenter of trade, with routes for goods such as silk, wool, salt, and grain passing over and around this Himalayan region (Furer-Heimendorf 1975). Aside from their involvement with trade, however, Humlis have had limited contact with the outside world. No roads connect Humla District to the rest of Nepal, and for this reason, it remains one of the most isolated regions of the country (Adhikari 2008, Levine 1988, Haddix 1998, McKay 2002).

Fourteen years ago, construction on a small dirt road began. Although this road still does not provide Humli villagers with access to the rest of Nepal, it does provide them with easy access to a market across the border in China. This new access brings up an array of questions. When roads are built in previously roadless areas, what happens?

For example, how do roads impact the economy and modes of commerce? How does new market access influence competition among villagers, social relations, social dynamics, and the movement of people? In the case of the Humla Road, will villagers see new items and ways of doing things, and choose to leave their natal village? Will this spur a wave of out-migration? Or will these new items become incorporated into the local way of life, with some gaining prestige and some not? What will happen to traditional ways of doing things? For example, how will agricultural practices change? Will people even want to eat their local foods? And how will the road impact access to health care? Will local forms of healing and curing diminish as villagers
gain access to more allopathic forms of care? And what about what people want? Do they want the road? Will it make their lives better?

To get a better sense of villagers’ opinions of the road, as well as a general idea of how the road has already changed some facets of life, I traveled to Humla District to conduct a pilot study for my research.

1.1 Pilot Study Observations

My pilot study took place in March 2013. The primary aim was to determine the research questions that were of most pressing need of further inquiry. During my three-week investigation, I traveled to seven villages, often accompanied by one or more locals. Villagers provided me with insight into how the road has impacted their lives. What resonated with me the most from those initial conversations was how the new market access had already begun to change villagers’ eating habits.

Locals explained to me that the road has already made it easy to obtain enriched, processed foods from the Chinese market. Villagers listed white rice, white flour, ramen noodles, candy, alcohol, juice, and soda as the items they purchase most frequently. According to villagers, there are significant economic incentives for purchasing foodstuffs in China; items are typically less than half the price of similar items in Simikot, the capital of Humla. Additionally, for those villagers living near the road, access to China and transportation of food items are much easier. I was also informed that many of these Chinese market-purchased foodstuffs are considered status symbols within their community, and, therefore, villagers often prefer to eat Chinese products instead of their traditionally grown crops (for example, bitter buckwheat, wheat, and barley).

During my pilot study, however, I was also made aware of the fact that Chinese market access is limited to the summer/fall months (July-November) due to the heavy snowfall, which makes road travel and Chinese-market access impossible during the rest of the year. Even during

1 Because there are no roads that connect Humla District to the rest of Nepal, all of the foodstuffs and household items that are available for purchase in Simikot come via airplane from the south of Nepal. For this reason, they are very expensive. According to interview data, food prices are typically 200 percent more in Simikot than they are in Kathmandu, the capital of Nepal.
the summer/fall months, the weather in the Himalayas is highly unpredictable; many villagers explained that there never was a guarantee that the road was going to be clear of either snow or wind-induced rock fall. Additionally, villagers said they are at the mercy of fluctuating market prices dictated by the strength of the Chinese yuan. Even with these constraints and uncertainties surrounding access to the market, it became clear to me that villagers were rapidly shifting their diets to include the enriched, processed, market-purchased foods.

The map in Figure 1.1 illustrates the location of Humla District within Nepal and the approximate location of the new road.

Figure 1.1 Humla, Nepal: Located in Nepal’s Himal Zone, Humla is the farthest northwest district in the country (see the black arrow). The black line represents the location of the first road to be built into Humla. The road begins in China and ends 45 km inland in Nepal. This map also shows the location of Simikot, the capital of Humla, where villagers also have the option of purchasing household and food items. Source: [http://un.org.np/maps/nepal-administrative-boundaries](http://un.org.np/maps/nepal-administrative-boundaries)

1.2 Research Questions

My pilot study observations stimulated my interest in how increased access to markets, afforded by the new road, is impacting villagers’ health. Specifically, I decided to further investigate how an additional food source is impacting villagers’ food security. Villagers told me that most households now have access to more food, but I was curious whether this is in fact the
case for everyone or just for those households with excess resources who live directly on the new road. Following up on the issue of how the road is impacting villagers’ access to greater quantities of food, I decided to additionally investigate the types of foods that villagers are purchasing in China to decipher whether these foods are negatively impacting the nutritional value of villagers’ diets. Again, I was curious as to whether the nutritional consequences of the new road are equally distributed across the population, or if those individuals who ascribe more prestige to the market-purchased foods are experiencing a higher rate of negative dietary outcomes.

In addition to my food-related interests, I was curious as to how the new road is impacting villagers’ perceptions of their own health. While conducting my pilot study, I continuously heard comments such as, “We are so happy about the road!” and “Life is going to be so much easier when the road comes!” Comments such as these sparked my interest in how exactly the arrival of the new road has impacted villagers’ subjective well-being, and whether there are differences in the well-being of villagers depending on how they are able to utilize the new road.

I conceptualized my research as encapsulating three health domains: food security, diet and nutrition, and subjective well-being. By assessing the impacts of the new road on these three health domains, my aim is to better understand how villagers are responding to this structural change, and whether villagers’ behavior change is having access-related (food security), objective health (nutrition), and/or subjective health (well-being) consequences.

My primary research question is whether villagers’ proximity to this new road is the biggest predictor of their health outcomes, or whether another variable (such as gender, age, and/or socioeconomic status) is perhaps a stronger predictor of villagers’ health outcomes. This research question allows me to examine whether the road is having homogenous health impacts across the population, or whether intra-village, and perhaps even intra-household variability exists among health outcomes.

1.2.1 Broader Impacts

The human diet has shifted worldwide to include more processed foods that are lower in nutrients than their traditional, locally grown counterparts. It is widely known that this shift has
contributed to an array of negative health consequences, including the emergence and rise of chronic diseases. Maintaining a healthy diet is an easy way for individuals to lower their risk of these types of health problems. Unlike genetic dispositions, maintaining a healthy diet is something that individuals can, for the most part, control.

But despite the fact that approximately 75 percent of the United States' health-care budget is spent trying to combat chronic diseases and their associated health risks, these diseases remain the leading causes of death and disability in this country. Many developing countries are now fighting chronic disease as well, sometimes spending United States’ foreign aid funds to do so. It turns out that knowing the dietary causes of chronic disease is not enough to counter the trend. Dietary practices appear to be embedded in a sociocultural complex that quickly establishes deep roots. Understanding how this complex develops and how it is perpetuated may be the key to finding a solution.

Using the new road in Humla District, Nepal, as a case study, this research takes advantage of a unique opportunity to study human dietary shifts as they are in the process of occurring. Humli villagers now have access to a new food source across the border. Although this may provide an easy avenue for villagers to maintain food security levels (which may in turn increase villagers’ sense of well-being), it may also decrease the overall nutrient content of their diets. By assessing villagers’ decision-making patterns regarding their food consumption, the overall aim of this study is to gain an in-depth understanding of the dietary sea change that is leaving its mark on the quality of life across the globe.

1.3 Case-Control Observational Study

To answer the aforementioned research questions, I conducted a ten-month ethnographic case-controlled observational study in two villages: one through which the road passes (Gyepo, the “case village”), and another that lies on the other side of three 13,500-foot mountain passes, and, therefore, does not have direct road access (Kale, the “control village”). Both villages are in upper Humla, northwest of Simikot.

I have decided for confidentiality purposes to use pseudonyms for my two field site villages. The village names I chose are Tibetan: Gyepo (pronounced Gye-Pō), which in Tibetan means fast, and Kale (pronounced Kah-Ley), which in Tibetan means slow.
According to elders in Humla, my case village (Gyepo) was the fourth village to be settled in what is now Humla District after three villages in Limi Valley (the valley farthest northwest in Humla District). Gyepo is situated right along the principal trade and pilgrimage route from Simikot to Hilsa (the last village in Nepal before the Nepal/China border). Gyepo is the second-to-last village in Nepal before the Nepal/China border.

According to the elders in Humla, early Humlis settled in my control village (Kale) because it was right along the trade route from Humla District to Bajhang and Bajura, and thus provided great business opportunities for the villagers. Kale is situated on the south side of the Karnali River. From Kale, it is a one-day walk along a summer trail, across Sankha Pass, into the neighboring district of Bajura (Gutschow 1990). The actual name of my control village literally means “grassy-mountain pass” in the local Tibetan language. Decades ago, the main route through Upper Humla went directly through Kale, and the villagers from there were all said to be very forward-thinking and progressive. Now, Kale is considered by Humlis to be “the most remote village in Humla District,” and many Humlis consider villagers from Kale “backward.”

The map in Figure 1.2 shows the location of Gyepo and Kale in upper Humla District.
Figure 1.2: Detailed map of field site villages in Humla District: The dashed arrow indicates the location of the case village (Gyepo), and the solid arrow indicates the location of the control village (Kale). The line drawn on the map from Simikot (the district capital) to the Nepal/China border represents the footpath, or ‘main path,’ that villagers use in Humla District. Source: https://commons.wikimedia.org/wiki/File:NepalHumlaDistrictmap.png#/media/File:NepalHumlaDistrictmap.png

From Simikot, Kale is 18.42 miles to the west (though to reach it, one first walks along the footpath northwest and then turns south). From Kale, Gyepo is 12.8 miles to the northwest.

There are three ways to reach Gyepo from Kale by foot:

1.) Walk directly north and then follow the footpath west.

2.) Cross one mountain pass and join the footpath in a village farther west from option 1 and then continue walking west along the footpath.

3.) Cross three mountain passes and meet up with the footpath at an intersection even farther west from option 2 and then travel west along the footpath.

During my fieldwork, it took me two full days to reach Kale from Simikot on foot and two to three full days to reach the Gyepo from Kale.
1.4 Field Site Description

The two villages are very similar aside from their proximity to the road: Both lie at roughly 12,500 feet, are the only two villages in upper Humla to only have one growing season per year, and grow virtually the same crops. The villagers in both are Buddhist and ethnically Tibetan. Because of the similarity of these villages, they can be contrasted with one another to assess how villagers’ proximity to the new road is impacting their health, in terms of their food security, diet and nutrition, and subjective well-being. The following table (Table 1.1) provides a comparison profile of the two field site villages.

Table 1.1: Comparison of the case and control villages

<table>
<thead>
<tr>
<th></th>
<th>Case Village (Gyepo)</th>
<th>Control Village (Kale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative District</td>
<td>Muchu VDC*</td>
<td>Muchu VDC</td>
</tr>
<tr>
<td>Altitude</td>
<td>3850 meters (12,631 feet)</td>
<td>3800 meters (12,468 feet)</td>
</tr>
<tr>
<td>Topography</td>
<td>Relatively flat</td>
<td>Extremely steep</td>
</tr>
<tr>
<td>Crops Grown</td>
<td>Wheat, bitter buckwheat, mustard, radish, potato</td>
<td>Barley, wheat, bitter buckwheat, radish, potato</td>
</tr>
<tr>
<td>Ethnic Composition</td>
<td>Tibetan (Lama caste)</td>
<td>Tibetan (Lama caste)</td>
</tr>
<tr>
<td>Religion</td>
<td>Buddhist</td>
<td>Buddhist</td>
</tr>
<tr>
<td>Number of Households</td>
<td>36</td>
<td>31</td>
</tr>
</tbody>
</table>

*VDC: Village Development Committee (I explain Nepal’s administrative zones more in detail in Chapter Two).

Although both villages are remarkably similar, during my ethnography I discovered some fundamental differences between them that are unrelated to their proximity to the road but that may be impacting villagers’ health outcomes. Perhaps the most striking difference is in relation to the topography. Gyepo, although entirely surrounded by mountains upward of 19,000 feet, was built on a large section of flat land. The flatness of the land provides villagers with more space to build houses and cultivate their fields. Additionally, it allows the villagers to simply let their cattle graze on the land directly in front of their houses instead of having to take them up to high alpine pastures to graze after harvest time. Considering that the topography is very flat, the daily life of Gyepo villagers is much easier, requires fewer resources (i.e. energy and time), and involves fewer risks from natural disasters such as landslides than daily life in Kale. The following photograph (Figure 1.3) shows the flat topography of Gyepo:
Figure 1.3: Flat topography of Gyepo village: The case village, although surrounded by steep mountains, has flat land on which villagers plot their fields and graze their cattle. This photograph was taken during harvest time in September 2015, looking south away from the new road.

In comparison to the case village, the control village is situated on an extremely steep slope. Landslides are a frequent occurrence and often cause damage to houses, crops, and even animals (during my stay in Kale, three animals slipped off the path to their deaths in the valley below).
The difference in topography also manifests itself in the styles of houses that are typical in the villages, in addition to the distances between houses. In Gyepo, where villagers have access to flat land, the houses are built primarily of stone and are large in size, and, because of the ample space, are built with plenty of room between them (Figure 1.5).
Figure 1.5: Typical house structure in Gyepo: This photograph shows two homes in Gyepo that are built next to each other. Houses are constructed from brick and wood, and often stand alongside only one other home. Most homes consist of three stories, with an entrance on the ground floor. Typically, there are flat roof sections on both the second and third floors.

In both villages, the typical home consists of three stories. The ground floor is comprised of the space that is used by the animals; they are fed there and also sleep there during the winter months. The second floor is where the villagers have their wood-burning stoves, and, therefore, it provides the space for cooking, eating, and simply passing time with family and friends. In most cases, the second floor is also the area where the family sleeps because it is nearest the hearth and thus the warmest. Most families also keep a small altar in the north corner of the room to adhere to Buddhist religious practices (see Figure 1.6). If the house has a third floor, it is typically small and leads out to a roof. The third floor is most often a storage space for foodstuffs or household items.
Figure 1.6: Altar in family home in Gyepo: The family altar is very important to the lay Buddhist practices of the villagers. Villagers place photographs of the Dalai Lama and various Rinpoches (incarnate lamas or highly respected religious teachers in Tibetan Buddhism), in addition to various offerings, on the altar.

Although the layout of the houses in both villages is similar, due to the steep topography in Kale, homes are built much closer together and into the hillside for stability. Even though many houses still have three floors, in most cases the floors are not accessible via the inside of the house (See Figure 1.7). Ladders connect the levels of the house to one another, which means that villagers need to go outside to reach the different sections of their houses. Because space is limited, houses are often connected by shared walls, are smaller, and are grouped much closer together than the houses in Gyepo. Due to the close proximity of their houses, villagers commonly travel through the village via house rooftops, using ladders to get from village section to village section.
Figure 1.7: Typical house structure in Kale: In Kale, the landscape is so steep that homes are built into the hillside, literally on top of one another. Pictured here is the third floor of one house, and above is the first floor of another.

Another noteworthy difference between the two villages is that parents send their children to different locations for secondary school. In Gyepo, most children whose families have the resources to send their children to secondary school send them to the Yalbang Children’s School, a school in upper Humla District that is a one- to two-day walk east along the footpath from Gyepo.³ In Kale, however, most children who attend secondary school study in

³ The Yalbang Children’s School is an excellent, progressive school that is funded as a partnership between various NGOs and INGOs and the Nepali government. The school has boarding facilities for all of the children who are not from Yalbang village (all of the children who attend Yalbang Children’s School from Gyepo or Kale board at the school). In addition to teaching the mandatory courses, this school has sports teams, traditional dance clubs, and cooking classes where students can learn how to cook traditional meals. In 2015, all of the students in Class 10 passed the SLC (the standardized test that all Nepali students have to take after Class 10); this is a great indication that the level of instruction is good.
India at one of His Holiness The Dalai Lama’s schools. Interview data suggest that “herd mentality” is part of the reason most parents from Kale decide to send their children to India for schooling. Many parents in Kale indicated that because numerous children from other families in their village were already in India, it was easier for them to also send their children there because of the existing social networks.

Data suggest that this difference in where parents from Gyepo and Kale send their children to school has a vast impact on a households’ human capital (defined as the number of able-bodied persons in the home available to conduct daily tasks). For example, villagers in Upper Humla harvest their crops during the time of the Hindu festival of Dashain (the longest festival in the Nepalese annual calendar) and Tihar (a five-day festival that comes soon after Dashain). Because many of the children and teachers at the Yalbang Children’s School are Hindu, there is a lengthy holiday break from school. Because children from Gyepo only live a day’s walk from their home village, they always spend their holiday back in Gyepo with their families. While home, those who are old enough actively help their parents in the fields, greatly reducing the time that it takes to harvest crops and prepare for the winter months. Most of the children from Kale, however, attend the Tibetan schools in India and live far away from their village, and, therefore, return home only once every few years.

These aforementioned examples of village differences (topography and location of children’s schools) are two impactful differences that are entirely unrelated to the villages’ proximity to the road. It is important to keep these dissimilarities in mind because they play a role in the diverse health outcomes of villagers, as outlined in the chapters that follow.

In the next chapter, I discuss in more detail the geography and history of Humla, as well as the ethnic, religious, and linguistic composition of the individuals who live in Humla District. I also go into more specifics about the first road in Humla District, as well as highlight results from other similar health-related rural road studies. In Chapter Three, I provide the theoretical context for my research, and in Chapter Four I explain in detail the variety of methods I employed during my fieldwork. In Chapter Five, I provide data on the socioeconomic status

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4 The Dalai Lama himself has funded numerous schools in India for Tibetan refugees. Most of the children from Kale who have been attending these schools have done so semi-illegally because the children from Upper Humla, although they are ethnically Tibetan, are not technically Tibetan refugees. In the past, these Tibetan schools in India have accepted the children from Kale, but Humli locals think there will come a time when it is not as easy for Kale children to attend the Dalai Lama-sponsored Tibetan schools in India.
levels of villagers; while in Chapters Six to Eight, I present, analyze, and explain the data I collected during my fieldwork. I break the results chapters into three sections (one per health domain): 1.) Food Security, 2.) Diet and Nutrition, and 3.) Subjective Well-Being. In Chapter Nine, I summarize my results, offer health-related recommendations, and provide suggestions for further research. Because Nepal has endured so much structural change and hardship (due to the earthquake, the drafting of the new constitution, and the Nepal/India blockade), I also wrote an Epilogue (Chapter Ten), in which I discuss how both the earthquake and recent blockade in Nepal have impacted both Humla District and, more broadly, Nepal.
Chapter 2

*Humla District, Nepal: Then and Now*

2.1 Introduction

In this chapter, I provide the geographical, historical, and sociocultural context for my research. I begin by providing a brief synopsis of the geography and history of Humla District, and then assess the ethnic, religious, and livelihood landscape of the region. I paint a picture of Humla District, discussing villagers’ livelihood options and current health-care situation. I then discuss access into the district: how it was accessed prior to the road, and how the new road is bringing about change. To explain the uniqueness of this road, I examine it within the larger framework of Nepal’s strategic road network. I then draw on previous road-related scholarship to identify positive and negative health outcomes that have come as a result of rural road development in other parts of the world. I conclude this chapter by referencing a few anecdotes to show how the Humla Road has already impacted the life and health of Humli villagers and discuss how my research will build upon preexisting scholarship.

2.2 The Geographic and Sociocultural Landscape of Humla District

2.2.1 Geography

Humla District is part of the Karnali region of northwest Nepal, and it is Nepal’s second largest district (after Dolpa), covering an area of 5,655 sq. km. It is surrounded by Mugu District in the east; Bajhang District to the southwest; Bajura District to the south, and Tibet Autonomous Region of China to the north and west (refer to Figure 1.1, in Chapter One).

Geographically, Humla straddles 30°N latitude and lies between 81° and 82° longitude, making it one of Nepal’s “High Himalayan” districts (McKay 2002). Humla is actually the

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5 Throughout the chapter, I refer to the new road as “The Humla Road.”

6 I acquired these anecdotes during my pilot study, which took place in Humla District in March 2013.
highest district in Nepal, with an elevation ranging from 1,524 meters (5,000 feet) to 7,337 meters (24,071 feet) above sea level. In part due to the harsh terrain that comes with its elevation, Humla is often referred to as Nepal’s most-remote district (Fürer-Heimendorf 1975). More than 50 percent of the land in Humla is at a slope of more than 30 degrees, which makes irrigation almost nonexistent (Khatiwada and Ghimirey 2009).

Humla lies in the rain-shadow of the Dhaulagiri and Annapurna Himalaya, and, therefore, receives far less of the monsoon’s precipitation. It is comparatively arid, less intensively farmed, and more sparsely populated than other areas in Nepal’s Himalayan region (Razzetti 2000). Yearly rainfall in Humla varies from 800 mm in the North (where Gyeipo and Kale are located) to 1200 mm in the South (Rokaya et al. 2010). In addition to the climate being very dry, much of Upper Humla is snow covered and extremely cold for at least five months of the year. Due to the harsh winter climate, the growing season in the high-altitude villages in Humla is short, which further contributes to the district’s overall low agricultural yields (I further discuss the agricultural climate of my two field sites in Chapter Six). Given the relatively limited precipitation, coupled with the high elevation, rocky terrain, and harsh climate, only 1 percent of the total land in Humla is arable.

2.2.2 Early Settlement

Research suggests that various Mongoloid groups lived in this region between 2000 BC and 700 AD, until groups of Tibetans arrived sometime near the seventh century, spreading from west to east (Furer-Haimendorf 1966, Sanders 2012, Shrestha and Bhattarai 2003, Zurick 1989). These dates correlate with my interview data, which indicate that Humlis have been settled in the area for at least eight generations. According to Zurick (1989), a Tibeto-Burmese-speaking Magar king ruled the Karnali region of Nepal from the eighth to the twelfth centuries. According to my interviews, many small kingdoms existed at this time as well; one was named Maru Le.

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7 During my fieldwork, many villagers told me to speak to one older gentleman concerning the history of Humla. This gentleman was a member of parliament in the 1970s. In an interview, he said, “Exact dates are unknown of our (Humla’s) history….Nothing has been written down, even in our own language. People all know that we came from Tibet, and that we are Tibetan, but we do not know the details.” According to another local informant, “One of my great grandfathers had long ago written one text about Humla history, but it was written in the old Tibetan language, and we have yet to get it translated into anything that we can read. So we are unsure of its contents.”
which was where Simikot, the current capital of Humla, is now. Research suggests that around the beginning of the thirteenth century, the Khas invaded the kingdom in the Karnali region and merged it into the larger, multiethnic, Khas dynasty.

The Khasas originally entered the Asian subcontinent from the northwest, migrating into the hills either directly from western Eurasia or via the Iranian plateau. As the Khas moved eastward, an increased Hinduization of the Khas and others in the plains regions occurred (Sanders 2012). One of the defining features of the Karnali region, however, is the great ethnic, religious, and linguistic variation that exists, a product of the Khas making contact with people at the peripheries of the many small kingdoms in the lower Himalaya (Berreman 1963, Bishop 1990).

The Khasas were the linguistic ancestors of the Parbatiyas, or “people of the mountains,” the original speakers of what is now known as Nepali, one of the Indo-Aryan languages that borrows technical terms directly from Sanskrit (Whelpton 2005). One of the two languages currently spoken in Humla District is Humli Khas (a local dialect of Nepali), which is spoken by the Hindu population in Humla (those thought to have arrived as part of the Khas migration). The other language spoken in Humla is Lama Kham (a local dialect of Tibetan), which is spoken by the ethnic-Tibetan portion of Humla, including the villagers from my two field sites (those thought to have been part of the original Tibeto-Burmese-speaking kingdom).

According to an interview with a 46-year-old ethnic-Tibetan man from Upper Humla, Tibetans have been, and will always be, “people of the cold.” In other words, their culture (from their clothing to their house structure) and their livelihoods (high alpine crops and yak herding) all rely on cold weather. The Tibetans who migrated into what is now Humla District only migrated as far southeast as they could before the temperatures got too warm for yak grazing to still be a viable part of their livelihood. According to a local Humli who works in the health sector in Simikot, another reason the Tibetans did not migrate farther southeast was due to their fear of contracting disease (specifically malaria) that was running rampant throughout much of Nepal.9

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8 Many villagers I spoke with about the local history referred to the kingdom of Maru Le and indicated that it was once where Simikot is now. The other kingdom often referred to was located where the capital of Jumla, Nepal, is now.

9 There were numerous malaria outbreaks in Nepal, mostly in the southern or Terai region of the country, until a massive eradication campaign, led by USAID, was implemented in the 1950s. After malaria was
Limí Valley was the first area in present-day Humla to be settled by Tibetans (which makes sense as it is the farthest northwest valley in the Karnali region). Locals informed me that it is believed that the three monasteries initially built in Limí Valley date back between 800-1000 years. During the ninth to eleventh centuries AD, the Khasas had managed to control much of what are now northwestern Nepal, western Tibet, and the Indian Himalayas (Bista 1991, Furer-Haimendorf 1975). The area that is now Humla District was then at the border of the Hindu Khas to the southwest and south, and the Tibetan militarist groups to the west and north. According to interviews, the village of Yangar (the word gar meaning “fort” in Tibetan) was initially used as a fortress settled by Tibetan troops that were tasked with protecting their land from the people to the south.

The linguistic, ethnic, and cultural landscape of the northwestern region of Nepal (which includes Humla District), was, in turn, shaped predominantly by political oscillations that led many groups from what is now present-day India and China to seek refuge in the protected areas of the Himalayan region (Bishop 1990), where military force could not be executed as easily (Furer-Heimendorf 1975).

Nepal as a state emerged in its present form only in the late eighteenth century when the small hill kingdom of Gorkha, eighty miles west of Kathmandu, brought much of the Himalayan foothills and an adjoining strip of the North Indian plain under its control (Whelpton 1995). Before the Gorkha conquest, the kingdom of Nepal consisted mainly of the Kathmandu valley, which was ruled by three Malla kings (Gupta 1964). By taking control of this land, the Gorkhas allowed the kingdom’s Shah Dynasty to move its court to the Kathmandu Valley, where they remained on the throne in Kathmandu from 1846 to 1951. During this time, Prithvi Narayan Shah and his successors attempted to use the older administrative systems of Gorkha and the kingdoms of the Kathmandu Valley to run the central government of a united Nepal. Even though the Shahs were technically in power, effective political power was fundamentally in the hands of the opposing political party, the Rana family (Whelpton 1995). The Ranas became experts at isolating Nepal from many of the changes that were happening throughout the world (including in nearby India). They ensured that the majority of Nepalese remained illiterate and uninformed about any part of the world outside of their villages (Kumar 1933). They did not encourage the growth of new industry, even when British assistance was offered. A direct consequence of this was the stagnation of industrial production in Nepal; it was the same in 1950 as it was in 1850 or even in 1800 (Kumar 1933: 134).
2.2.3 Ethnicity

The total population of Humla is around 45,000 inhabitants, with 5.84 being the average household size (Nepal Census 2011). Humlis are a diverse group with the following ethnic composition: Chhetri (44.2 percent), Thakuri (19.5 percent), Lama (16.1 percent), Brahmin (6.2 percent), and the occupational castes such as Kami (Blacksmiths, 5.66 percent) Damai (Tailors, 2.36 percent) and Sarki (Cobblers, 1.2 percent). The remaining 4.78 percent of the population represents other ethnic group/s (Himalayan Children Society 2009). Hindus populate most of the southern part of Humla (there are mainly Chettris, but also Brahmins, Thakuris, and the occupational castes). This ethnic diversity in Humla can largely be explained by the political fluctuations that occurred for centuries in the Karnali region (Zurick 1989).

My research site is located in the northern part of the district, Upper Humla. Three ethnic Tibetan groups, referred to as “Lama” throughout the region, populate this area. In the 1980s, the Nepali government assigned all Tibeto-Burmese-speaking groups in northern Humla the surname of Lama to make the census process easier. This generalization occurred despite the fact that these groups have very different ethnic and clan backgrounds (Levine 1987, Sanders 2012). Notably, the distinction between an ethnic group and a caste is not recognized in colloquial Nepali, which uses jat (descent group) for both (Whelpton 2005).

2.2.4 Religion

The Hindus who inhabit in the lower part of Humla practice Hinduism (78.2 percent), while the three ethnic-Tibetan groups in the upper part of Humla are Buddhist (20.2 percent) (Nepal Census 2011). From Simikot, the capital of Humla, if one were to walk northwest towards the Nepal/China border along the footpath, the first two days of walking would be through Hindu villages, and then on the third day, one would reach the Buddhist villages that continue into China (Tibet).

The ethnic-Tibetans in Humla practice one of two schools of Tibetan Buddhism: 1.) Nyingma (the oldest of the four original schools of Tibetan Buddhism), and 2.) Kagyudpa (regarded as one of the six main schools of Himalayan, or Tibetan, Buddhism). Villagers from
Muchu or Kangal Village Development Committees (VDCs),\textsuperscript{14} which include the two field site villages, are mainly followers of the Nyingma School and referred to as \textit{Panchthapali}. Villagers who reside southeast of Simikot are also followers of the Nyingma School, though they are referred to as \textit{Nyinba}. Humli from Limi Valley are followers of the Kagyudpa School and are referred to as \textit{Limiba}.

There are six monasteries in upper Humla. The first three were built in each of the three villages in Limi Valley (Til, Halji, and Zang), as previously mentioned. These three monasteries all follow the Kagyudpa School. The fourth monastery was built farther southeast on a hill, slightly west of the fortress village of Yangar. This monastery follows the Sakya School. According to my interviews, for many years, this monastery existed in isolation from any village. Then, according to one of my informants, “As monks from the monastery began to marry women from other villages, the village of Thumkhot was formed around the monastery.” The fifth monastery, Raling Gompa, follows the Nyingmapa School and is located outside of Nimatang, farther southeast from the two field site villages. Much later, in the mid-1980s, a Nyingmapa monastery was built in Yalbang village, which is located slightly east of Yangar.\textsuperscript{15}

2.2.5 Livelihoods

To diversify their livelihoods and minimize risk, Humlis have for centuries seized upon trade as a means of profiting from their strategic location at the intersection of the Himalayas and the Tibetan Plateau (Fürer-Haimendorf 1975). Historically, ocean and tropical produce were

\textsuperscript{14} At the time of my fieldwork, Nepal was administratively broken up into seventy-five districts. All of these districts were situated in fourteen zones and five development regions (Far Western, Mid-Western, Western, Central, and Eastern). Each of these seventy-five districts is comprised of municipalities, further divided into District Development Committees/Areas made up of Village Development Committees/Areas (VDC) (which I referred to in the main text), and further broken down into wards.

With the drafting of the new constitution in September 2015, the way in which Nepal was divided administratively was changed, which became a major point of contention and helped to spur the Nepal/India blockade that occurred from September 2015 to February 2016. These administrative changes and the nuances behind the blockade are issues that I discuss in Chapter Ten. I also discuss how both the writing of the new constitution in Nepal and the Nepal/India blockade impacted Humla District.

\textsuperscript{15} Although the monasteries in Upper Humla follow different Buddhist sects (Kagyudpa, Sakya, and Nyingmapa), villagers adhere to the teachings from these monasteries relatively equally. According to interviews, villagers engage in many lay-Buddhist practices (which I discuss more in Chapter Eight), and they do not limit themselves to one particular sect of Tibetan Buddhism, because, according to my research assistant, “They are all very similar to one another.” Villagers tend to visit the monasteries in Humla based on which one is having a \textit{dharma} (teaching), and which one is potentially closer to home.
brought from the Indian Gangetic plain, alpine goods and salt from the Tibetan side, and grain from the Nepalese mid-hills that was valued by both sides (Shrestha 2010). Relying on their profound knowledge of the terrain, Humlis acted as intermediaries in this international trade and cultural exchange without the use of roads, motorized transport, long-distance communication, or storage (Chakravarty-Kaul 1998). Furer-Heimendorf (1975) confirmed that there were once two main trade routes that ran directly through Humla District: one along the Mugu Karnali and one along the Humla Karnali River.

To the northwest of Humla lies the Tibetan Plateau. While the nomads of Tibet lack grains, “they live in proximity of an ancient ocean—the expansive salt flats of the Tethys Sea, an inland ocean lifted up by the subduction of the Indian subcontinent to dry upon the highest plateau in the world” (Bauer 2004). These salt flats of southwestern Tibet lie just over Humla’s borders to the northwest. Historically, Tibetan nomads doubled as salt caravanners to supplement their incomes and secure grain supplies from Nepal. Using wooden rakes, nomads would scrape the salt into large, pyramid-shaped piles. They would then spend hours separating the mineral salt crystals from the brine before filling satchels of salt for trading (The Saltmen of Tibet 1997). The Pahar zone (middle hills) of Nepal, on the other hand, produced a surplus of corn and millet, yet yielded no salt. Humlis capitalized economically by acting as the middlemen and facilitating the salt and grain trade; they were situated directly in the middle of these two codependent economic and ecological zones.

Individual traders from Humla traveled collectively with other traders and animals in a caravan to engage in trade. A caravan is normally organized by kinship or other long-term relationships (Bauer 2004). Given the demanding work and protection required to keep livestock and trade goods safe, migrating as a caravan was the only option for risk mitigation. While younger members of the caravan undertook more of the physical chores, such as fetching water or dealing with stray animals, the senior members made strategic decisions, such as where to cross a river or whether to wait out harsh weather (Fisher 1987).

A lead yak, called the lampa, was chosen for its strength, smarts, and ability to set the pace for the caravan (Bauer 2004). The remaining caravan animals were grouped by hierarchy; male yak, with their heavier loads, walked in the front of the pack, while dzoo (a yak/cow crossbreed) and other animals trail behind. The salt-grain trade involved more than simply an economic transaction. The most important relationship of this trade exchange was that of the
nestang, which literally means, “nesting place.” A nestang relationship is a form of patrilineal economic contract that ensures that two partners will agree to trade with one another. Solidified by an oral agreement, nestang relationships may endure for generations (Crook and Osmaston 1994).

The Chinese government severed many of the trading ties and nestang relationships that Humlis had with Tibetans by closing the border and restricting the movements of Tibetans with their animals and goods. After the failed 1959 revolt of Tibet, the Chinese placed a number of restrictions on interregional trade and pasturing movement among inhabitants on both sides of the border (Bishop 1990: 155). In the 1960s, the Chinese began monopolizing Tibet’s salt market by setting exchange rates, limiting dates for trading, and levying taxes (Bauer 2004). Salt traders had to be licensed, and there were strict quotas on how much salt could be traded. The Chinese closed many of Tibet’s regional trade marts (where much exchange between Humlis and Tibetans took place) because they were encouraging the Tibetans to trade via political ties instead of economic and/or cultural ones (Bauer 2004, Spengen 1997). According to Goldstein (1983), Humlis were legally allowed to trade only in the official trading center in Purang/Taklakot16 (across the border from Hilsa, where the new road in Humla originates) and then only with official agents of the government. The Chinese reopened the border in 1963, but according to Bishop (1990), this did little in the way of allowing reversion to the traditional trade lifestyle that once existed between Humlis and Tibetans. Bishop writes:

After the Chinese reopened the border to trade in 1963, not only did Tibetan salt and wool remain in short supply, but the Chinese imposed numerous restrictions that altered the manner in which trade with Tibet was conducted. The Tibetan salt monopoly…was irrevocably broken, to the economic detriment of most mountain dwellers. Today Karnali traders are not permitted to trade directly with their traditional Tibetan partners. Instead they must deal through Chinese officials who stipulate what Nepalese commodities will be accepted…and at which rates of exchanges…The Chinese insist on inspecting each load for quality and on measuring all grain…by weight rather than volume (1990: 311).

16 Taklakot and Purang are both names for the market town across the border in China. They are used interchangeably throughout Humla District; Taklakot is the Chinese name and Purang is the name in Tibetan.
Another political-economic factor that compounded the hardships that these traders faced was the increasing availability of Indian salt in the hills of Nepal. Improvements in roads and transportation infrastructure (e.g., airports and roads) have made iodized Indian salt more readily available to rural communities in Nepal, with concomitant declines in the demand for, and the price paid for, Tibetan salt (Bauer 2004). With the arrival of this additional salt avenue, the economic incentive for Himalayan villagers to travel for an extended length of time in such harsh conditions quickly evaporated.

In addition to the reduction in salt trade with Tibet, the Chinese also reduced the amount of wool (used for spinning, weaving, and carpet-making) that was allowed to leave the country; the wool was another lucrative item for Humlis to trade (Fürer-Haimendorf 1975). The Chinese also denied the Nepalese access to their historic winter-pasture grazing land. The only group who managed to avoid this was the ethnic Tibetans living in Limi Valley (the inhabitants of the valley in far northwest Humla whom I referenced earlier in this chapter) because they made special arrangements with the Chinese that allowed them to continue pasturing in China/Tibet.

A few other Nepalese groups living along the Chinese border to the east (e.g., the Nyishangba, the Sherpa) were granted economic privileges by King Mahendra (who ruled Nepal from 1955-1972) that allowed them to engage in international trade and long-distance commerce in locations such as Hong Kong and Thailand (Bauer 2004). After the Chinese halted free movement across the Tibetan border, not only was trade reduced to a fraction of what it historically had been, but the productive output of Humla’s pastoral system had also shrunk considerably.

During this time, when many trading restrictions were being imposed on Humli villagers, Nepal as a state was in the panchayat era (1962-1990), a time that endured much social change and administrative change, as the Nepali government created Village Development Committees (VDCs) throughout the country, including Humla District, to organize the land into subsections.17

17 Nepal remained in what was known as the “panchayat era” from 1962 to 1990. It was a time when Nepal was “open” to the west yet “closed” to internal party politics, and a time when power remained centralized in the royal palace (Weston 1995). During the panchayat era, there were no civil rights; all media was controlled; the use of ethnic language was regulated; citizens had few political rights; there were many violations of human rights (for example, torture was legal), and Nepalese citizens had extremely limited access to market goods. At this time, the Nepalese army was also completely loyal to
2.3. Nepali Politics and Its Influence on Humla District

2.3.1 The Panchayat Era

During the panchayat era, the ethnic-Tibetan portion of Upper Humla was carved into the following VDCs: Limi, Muchu, and Khagalguan (Gyepo and Kale are both located in Muchu VDC). According to my informants, a pressing issue during this time was that even though Humla was then officially part of Nepal, it was very hard for Humli villagers to be recognized as Nepali citizens by the government (this was apparent in that it was extremely difficult for Humlis to receive a citizenship card).

Although Nepal was never officially colonized, it is safe to say that the majority of Nepalese were “colonized” from within their own country by the ruling elite (Gurung 2003). During the panchayat era, the enforced ideology was “one nation, one dress, one people.” The ruling elite was attempting to conform all 103 social groups of Nepal (DFID Nepal 2008), which included various caste and ethnic groups, into one. Nepali was the only language that people were allowed to speak or that was broadcast on the radio. The panchayat era was a time of numerous economic and social benefits for the elite Nepalese; it was also a time when many villagers, women, and/or ethnics were severely marginalized culturally, socially, economically, and politically.

2.3.2 The People’s Movement

The high level of inequality that Nepal was facing in the late 1970s helped the “People’s Movement” gain traction in 1979. This movement originated with Tribhuvan University student-uprisings in Kathmandu and was followed by the 1985 Satya graha (Gandhian nonviolent civil disobedience movement) (Hutt 2004). Roughly a decade of uprisings and protests culminated in 1990, when the People’s Movement of Nepal managed to introduce a multiparty system to the king. The panchayat era formalized Nepal’s two-tiered society that consisted of the aristocracy and the peasantry, with no middle class in between. Another important characteristic of this time was the disconnectedness between the international discourse about Nepal and the realities of life in Nepal. For example, the Shah rulers would give 50 percent of all foreign aid that came into the country (from USAID in particular) to the royal palace. Consequently, little monetary aid remained to reach the isolated villages of Nepal (for example, the villages in Humla District) (Gurung 2006).
country. This new government system was designed so that elected governments would rule the country (Hutt 2004). It was not until 1990 that the people of Nepal once again won their fundamental civil and human rights, regained access to their freedom of speech (including the ability to speak their own native languages), and were able to obtain an array of market-purchased goods. Even after the People’s Movement, however, certain inequalities, such as economic inequalities and social exclusion of the dalit (the “untouchable” caste), janajati (ethnic groups, including the ethnic Tibetans in Humla District), madhesi (underprivileged persons in Nepal-India border area), and the country’s youth remained a visible part of Nepali culture (Gurung 2003, Gurung 2006). These groups remained below the poverty line, continued to have very low literacy rates, and were far behind the elite in terms of human development (e.g., life expectancy, educational attainment) (Bennett et al. 2006).

In 1990, the CPN (Maoist) Party was a legitimate political party that was concerned with the ever-present disparities that were affecting the marginalized sections of the population across Nepal. Although they were never electorally successful, their increasing popularity caused them to be barred from running candidates in the 1994 elections (Whelpton 1995). In 1996, in opposition to this ban, they began a rural armed insurgency that ultimately launched the country into a ten-year civil war (1996-2006) in which approximately 13,000 people lost their lives, much of the country’s national infrastructure was destroyed, and the economy came to a standstill (Hachhethu 2004). Maintaining political stability was difficult after the start of the civil war. According to my interviews, many villagers in upper Humla were supporters of the Maoist movement because they felt that they were marginalized due to their ethnic identity (including their local language and cultural practices). A number of women from Humla joined the revolution, in part because the gender equality rhetoric appealed to them. Additionally, by joining the movement, women were provided with the opportunity to leave their villages and see more of the country (Sanders 2012).

In 2001, the civil war was at its height. After years of severed peace agreements and numerous resurgences of violence, a royal coup took place in early 2005. Who orchestrated the events leading up to this coup is still contested. Many Nepalese initially supported it because

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18 To this day, there is disagreement about who was involved with coordinating the events leading up to this coup. On June 1, 2001, King Birendra, Queen Aishwarya, and other close relatives were killed in a shooting. Some sources say that the Crown Prince Dipendra shot them and then himself, though many other sources indicate that other interested parties were involved, and perhaps it was a conspiracy. Many
they viewed it as a successful avenue to control the Nepalese economy and end the civil war that had been plaguing the country for years. However, the coup entailed suspending all political, civil, and human rights, and it allowed King Gyanendra to take control of all media (this included cutting phone and Internet access) (Hutt 2004). By 2006, Nepali citizens had reached their limits of exasperation with the status of their country. It was not until January 15, 2007, however, that the new (un-elected) interim government included the Maoist party; this inclusion led to a peace agreement.

Although there was technically a written peace agreement in 2007, disagreements among political parties continued for the next eight years. During this time, the government failed to reach a compromise on the components and idiosyncrasies of the new constitution, missing deadline after deadline. It was not until September 2015 that the constitution of Nepal was finally drafted (the effects of which I discuss in more detail in Chapter Ten).

2.4 Present Day in Humla District, Nepal

2.4.1 Livelihoods: Then and Now

In addition to engaging in trans-Himalayan trade, Humlis have always been agro-pastoralists, indicating that both animal husbandry and agriculture play major roles in both economic and cultural life. Himalayan pastoral communities, such as those in Humla, rely upon yak, cattle, yak-cow crossbreeds (dzo), goats, sheep, and horses to carry out their livelihoods.\(^{19}\) Dzo breeding is common because these animals combine the endurance and load-worthiness of a yak with the higher milk production and physiological tolerance to lower altitudes of cattle.

Nepalese allege that the Indians were involved; even the United States openly expressed its displeasure at the events at that time in Nepal. It is difficult to discern exactly who was behind these events with 100 percent certainty, though it is known that the United States, India, and even the United Kingdom did express opinions regarding Nepal’s political reform. Shortly after, Prince Gyanendra was crowned king. In July, only one month later, the violence associated with the Maoist rebel campaigns escalated; these violent protests led to the resignation of Prime Minister GP Koirala. In the fall of 2001, the Maoists terminated their four-month truce with the government and again launched a set of attacks on the police and military. By November, Nepal declared a state of emergency. The Nepali army was ordered by King Gyanendra to fight against the Maoist rebels (Hutt 2004).

\(^{19}\) Humlis have always relied on animals to assist them in their everyday needs. For example, while the dzo was typically used for transportation, the dung from cattle was used to heat the hearths, which villagers used as both for cooking and as a heat source.
Historically, villagers’ economic investment has been in sheep and goats, which were used primarily for wool, milk, and meat. However, Humlis reliance on, and economic investment in, their animals is changing in the face of new livelihood opportunities that have come as a result of innovations such as the new road now being built in Humla District (I discuss these changes in more detail in Chapters Five and Six).

According to villagers, timber harvesting has been the most lucrative business a family could engage in since the reduction of the traditional salt-grain trade. The demand for timber across the border in China has always been extremely high because the Tibetan Plateau has almost no timber to harvest (Bhattarai et al. 2010). However, approximately six years ago (circa 2010), the Nepali government made it illegal to sell timber harvested in Nepal in China, which forced many families to cease this practice, and, yet again, attempt to generate income from other sources. According to villagers in Kale, “We have a lot of worry now….It is much more difficult now than before to earn money…because the timber business is now illegal.” Even with this business being illegal, however, many households still appoint one male member of the family to engage in this trade, as often, there are no alternatives. According to my interviews, the Nepali police at the Nepal/China border often take bribes in exchange for letting Humlis cross the border with the harvested timber. Given this high level of corruption, it becomes up to the individual families whether this particular livelihood is worth the risk.20

Another lucrative livelihood in Humla District is the selling of medicinal herbs. Humla District is a region of high floral diversity with distinctive vegetation as well as a high degree of endemism. Various local medicinal herbs are frequently used not only for health purposes (which I discuss further in Chapter Six), but as cash crops as well (Rokaya et al. 2010). The three most lucrative herbs found in Upper Humla are cordakay (a medicinal herb said to have various medical properties), porry (an herbal remedy for asthma), and rato shau (morel mushrooms). Humli villagers collect these herbs in raw form and sell them to the highest bidder in Nepalganj (a town in the Terai region of Nepal) or across the border in Taklakot, China.

The issue of the Nepali government making it illegal to export a certain item to China and then taking bribes at the border is not limited to the timber business. The Nepali government has also made it illegal to import Chinese liquor into Nepal, but it continues to take bribes at the border, which facilitates yet another illegal livelihood in Humla (I discuss the issue of selling Chinese liquor in Humla as both a livelihood and negative dietary consequence of the road in Chapter Seven).
The year 2014/2015 was a very lucrative year for *cordakay*; according to villagers from Kale, each household profited around USD$700. Men collect this herb in Humla and then leave their village for approximately one month to sell it to the highest bidder in either China or India. Although one can harvest *cordakay* all year (except when there is snow), the best times are during May and then again at the end of Sept./Oct. (during this time the root is biggest, and, therefore, the herb is more valuable).

Although the collection and selling of herbs is legal in both Nepal and India, it is illegal in China. The bribery that exists within the timber and alcohol markets is similar to the bribery that helps to facilitate this livelihood. According to villagers, at the end of the season, right before winter, there is minimal security on the Chinese side of the Nepal/China border, and so people rely on selling it then.

The *rato shau* market, although legal, is extremely dependent on quality, which is highly variable. While some villagers reported earning USD$18 per kg, others reported earning as much as USD$120 per kg. Although *yartsa gunbu* (a fungus-infested caterpillar called, in translation, “summer grass, winter worm”) is extremely desired on the international market (one kg is worth USD$2,000 in China’s markets) (Bauer 2004), the quality of this herb is not very good in Upper Humla, and, therefore, is not collected and sold by Gyepo or Kale villagers.

One issue with both the timber and medicinal herb livelihood is that they have illegal components, either on the Nepali or Chinese side. Another issue often mentioned by villagers is limited resources in terms of human capital. Villagers often explained to me that if human capital is not high enough in the household, engaging in any livelihood where one person is required to leave the village for long periods poses a large problem. According to a 32-year-old woman from Kale whose son is engaged in the herb business:

In order to gather herbs, or be in timber business, you need an extra person. Mostly it is men who go, often the oldest son. They are gone from the village for two months, and then have to travel to China to sell the herbs or timber. This is hard because I am left at home with so many duties (cooking, cleaning, watching the children, tending to the fields and the cattle). If it is a small family, the women have to suffer.
A fourth livelihood option for Humli villagers, which a very low percentage of households are able to engage in, is the ownership of a small restaurant/hotel. In Humla District, along the main footpath from Simikot to Hilsa, there are numerous restaurants/hotels that are frequented by local villagers who are engaging in trade and the selling of herbs and/or timber, or who are merely traveling to another village to visit family and/or friends. Although one might suspect that these businesses would also cater to tourists, the tourist-market does not exist in Humla District as it does in other parts of Nepal.

In previous decades, large groups of foreign tourists would trek though Humla District. They would, however, mostly bring their own supplies, and, therefore, their presence did not have a lasting positive economic impact on local businesses. In the last few years, based on my discussions with other anthropologists who have conducted research in Humla, the volume of tourists in Humla has decreased. This could be the result of other areas in Nepal (for example, the Annapurna Region) having more tourist amenities, and, therefore, the Nepal Tourism Board does more promotion for those areas. Given the cost of airfare to reach Humla District (round trip from Kathmandu is around USD$750), and Humla’s classification as a “restricted area” by the Nepali government (which means tourists have to obtain special permits, travel in pairs, and pay USD$7/day), it has become a rarity to see many tourists in Upper Humla District. During my many months in Humla, I saw a total of four tourists and heard of two others. Although locals often indicate wanting more tourist activity, at the moment tourism is not a viable livelihood option for Humli households.

2.4.2. Healthcare: Then and Now

While much has been accomplished in Nepal in combating some diseases (i.e. the USAID-led malaria campaign in the 1950s), morbidity and mortality rates are still very high.

\[\text{In terms of amenities for tourists, many other regions of Nepal (Annapurna, Langtang, the Tamang Heritage Trail, Everest) are able to provide much more than Humla District. In other regions, tourists are provided with comfortable rooms in teahouses, in addition to having a menu or food and drink options to choose from. These teahouses also have set prices for room and food depending on the season. In Humla District, so few tourists come through that staying in a person’s home requires negotiation. The restaurants and shops that operate along the trail typically are equipped with one common room, where local villagers who stay sleep on the dirt floor with a blanket that is provided. Because of the lack of amenities, the tourists who come through Humla tend to camp using their own tents, and, therefore, have never really supported the local economy.}\]
In Humla District, there is one district hospital (located in Simikot), one primary health post, eleven smaller district health posts, and fifteen sub health posts (one per VDC) (WUPAP 2015). Even with these facilities, however, health care in Humla is severely lacking and presents a very serious problem for local people.

One aspect of the problem lies in finding appropriate resources and staffing for these health posts. Many of the formally trained health workers who are posted to remote, resource-poor areas of the country (such as Humla District) seek out the opportunity to transfer to other locations that have more resources at their disposal. A remote posting is challenging for nonlocal health workers, “as they lack appropriately trained support staff, rarely have supplies, often work in dark, cold buildings without furniture (even examination beds for patients), and without proper social support” (McKay 2002:4).

Villagers in Humla have access to three types of disease and illness treatment:

1.) Biomedicine (Western medicine), which villagers have access to at either the health posts or sub health posts, if they have the resources to reach the facilities

2.) Healing via a local traditional healer or religious figure (these healers are called dhamis in the Hindu communities and amchis in the Buddhist communities) (McKay 2002:20)

3.) Home-remedy or self-care, which typically involves using locally collected, medicinal herbs for treatment (i.e. hot apricot soup is believed to cure an upset stomach).

According to a health study conducted in four villages in Humla in 1999, most villagers use a combination of these three treatment methods (McKay 2002).22

Even if villagers are able to access treatment, however, health problems are known to continue to arise after treatments have been prescribed because germ theory of disease is a foreign concept to many local Humlis (for example, often patients do not follow the appropriate dosage instructions, while other times they may simply share their medicine with others in the village who seem to be having similar health issues).

22 According to previous ethnographic accounts of the region (McKay 2002, McKay 2003) and my conversations with the local amchi (Tibetan healer) in Humla, villagers will most often first try home remedies to rid themselves of their ailments. If that does not work, the second attempt at healing is typically with a Tibetan doctor, where they are often prescribed a combination of medicinal herbs and a change in diet. If they are still feeling ill, villagers will schedule a visit with a biomedical doctor, if the doctor is available, and if they have the time and resources to visit.
The arrival of the first road in Humla District has had many impacts on villagers’ livelihoods and health-care options. In this next section, I discuss access to Humla District, and how this is all beginning to change with the arrival of the new road.

2.4.3 Access: Then and Now

Access to Humla district has historically been, and still is, extremely limited and difficult. Until very recently, there have been no roads in the entire district, and air travel continues to be sporadic. The only airport is in Simikot, and, until recently, it functioned without a runway tarmac. To reach Simikot by air, passengers typically fly from Nepalganj, a small town on the Nepal/India border in the western portion of the Terai. Flights only operate weather permitting, which, due to the landscape and frequent high winds in Simikot, is normally limited to the hours prior to 10 a.m. when the winds and fog are minimal. Air travel into Humla is also extremely costly, which is reflected in the high price of food items and other goods that are brought into the region (Chaudhary et al. 2010, Roman and McEvoy 2010).

In 1999, the World Food Program began building a road in Upper Humla with the idea of connecting Humla with China and the rest of Nepal. This project began as a “Food for Work” program, where villagers would obtain white rice as payment for working on the road. According to my interviews, this Food for Work program had numerous negative repercussions, both in terms of villagers’ livelihood and their nutrition. First, because villagers were offered a job to work on the road, in many cases this resulted in lower human capital in the villages. This forced some households to let a portion of their fields go fallow (because there were not enough people to work the fields); this choice, however, did not seem all that damaging at the time because villagers were getting paid in white rice in exchange for their labor on the road construction. Although villagers were able to obtain more white rice than they ever had before, this led to a decrease in villagers’ dietary diversity and led to villagers substituting their locally grown, nutrient-rich grain for the processed, white rice that was given to them by the World Food Program.23

23 There is only one village in Upper Humla that can grow white rice. All of the other ethnic-Tibetan villages in Upper Humla do not have the climate and appropriate soil for rice growing. With that being said, white rice is not a traditional crop, nor is it traditionally included in the ethnic-Tibetan diet. Although on the surface, the Food for Work program may have looked like it was increasing the food
Approximately seven years later, the World Food Program decided to end their involvement with the Humla Road project. According to villagers, this decision was not accompanied by a lot of warning for the villagers, who had come to rely on the work provided (and the white rice). Since then, progress on the Humla Road has been very slow; since construction began 17 years ago, only 45 kilometers have been completed.

2.5 The Humla Road

The Humla Road begins in Taklakot, a market town across the border in China. The road crosses the border into Nepal, runs through the village of Hilsa, over the 16,500-foot Nara Pass, and continues southeast from the Nepal/China border. Ultimately, the goal is to connect this road to other major highways in Nepal, though construction is occurring very slowly, due to the steep, rocky terrain in the upper part of the district. The Humla Road is only a wide dirt path, containing no paved sections. Due to the topography, numerous sections are barely wide enough for a truck to comfortably drive on. Frequent rock falls, landslides, and harsh weather make road repairs a weekly necessity. As of May 2015, the road terminates south of the Karnali River, at the village of Thumkhot. The map in Figure 2.1 illustrates the exact location of the road’s terminus.
The next step is to build a bridge over the Karnali River; this project, however, was underway for the duration of my fieldwork, and from conversations I have had with locals, it still is not finished. On the other side of the bridge, small, unconnected stretches of dirt road continue to be built, but as of March 2016, none of these sections has been connected to the main artery of the road that originates in China. The following photograph (Figure 2.2) shows the construction site where a bridge will eventually provide access over the Karnali River.
From previous studies on the impacts of rural road development, it is widely known that rural roads can foster growth in rural enterprises (Lokshin and Yemtsov 2005, Mu and Van de Walle 2007). According to a multisite case study conducted by the Asian Development Bank in Indonesia, the Philippines, and Sri Lanka, twice as many households located within a short distance of a rural road as opposed to those without road access reported having outside employment, business interests, or a secondary income stream (Hettige 2006).

Since the arrival of the road in Humla, a few additional business enterprise opportunities have also arisen; one of which is the opportunity for Humlis to run a small shop at the terminus of the road. At the site where the Humla Road terminates, villagers construct a yearly, temporary market that exists from July to November when the weather is favorable and the road to China is operable. At this market, Humli villagers can buy household items (such as blankets and soap), clothes, and foodstuffs at a slightly higher price than across the border in China, though for many this market is easier to reach than the market in China. Individuals from numerous villages
throughout Upper Humla have built temporary shelters (primarily made out of plastic and tin) to set up a small shop or restaurant to cater to the demand at the terminus of the road. The creation of this temporary marketplace has created another avenue of income-generation for numerous households from many Humla villages. The following photograph (Figure 2.3) shows the temporary market village during September when consumer traffic is heavy. During the winter months, villagers take down their temporary shelters and move back to their home villages.

![Figure 2.3: Temporary village at terminus of road](image)

*Figure 2.3: Temporary village at terminus of road: Life in the temporary marketplace is very difficult. There are no latrines, which means that everyone engages in open defecation. Overall sanitation is very poor, with high risk of waterborne diseases. Considering that this is a place for trading and for the purchasing of items, many men spend their evenings drinking high volumes of alcohol, which has been known to cause domestic disputes. Although this temporary market has been in this exact place for almost two years now (because construction is slow-moving), the market essentially moves with the road and is always located at its terminus.*

Another newly created livelihood that has come as a consequence of the road is truck ownership. Villagers in Humla District own four trucks, two of which are owned by families from Gyepo village. Truck ownership is an extremely lucrative business; however, the barriers to
market entry are also very high because it requires a large amount of start-up capital to purchase a truck from China. The following photograph (Figure 2.4) shows a truck transporting villagers back to the Chinese border to purchase more items.

![Figure 2.4: One of four trucks in Humla District: Because the road is mainly too narrow for trucks to pass one another, villagers have an agreement that every other day, the direction of travel changes. For example, if the four trucks head west on Monday, they will then head east on Tuesday; this is how they have managed to avoid collisions because backing up to maneuver around an oncoming vehicle is not an option.](image)

The Humla Road, however, is unique because it does not connect Humli villagers to any other road in Nepal. This road only provides Humlis with access to the Chinese market and additional amenities such as Chinese-run health facilities. In the following section, I situate the Humla Road within the larger context of Nepal’s strategic road network.
2.6 The Road Network in Nepal

In total, Nepal has 23,029 km of roads, 7,000 km of which were built in the last decade. Even so, half of the population in Nepal does not have access to all-weather roads (World Bank 2015). Only 42 percent of the roads in Nepal are blacktopped, with the rest a combination of gravel and earth (both which cannot easily survive harsh weather and are easily washed away during seasonal rains). Only 12 percent of Nepalese, including those who live in urban areas, consider the roads where they live “good” (Nepal Living Standards Survey 2011).

2.6.1 Highways

Nepal has five highways:

1.) The Mahendra Highway, also called the east-west highway, runs across the Terai region of Nepal and cuts across the entire width of the country.

2.) The Prithvi Highway, perhaps one of the busiest roads in Nepal, connects Kathmandu with Pokara and then Baglung.

3.) The Siddhartha Highway, a largely mountain-road that is often blocked by landslides during the monsoon, connects Sunauli at Shiddarthnagar to Pokara via Tansen.

4.) The Tribhuvan Highway, which is Nepal’s oldest highway, links Kathmandu to India at Birganj (the border crossing that was obstructed in the Nepal/India blockade, see Chapter Ten).

5.) The Arniko Highway, considered the “gateway to Everest,” is the only highway that connects Kathmandu to Tibet at Kodari (Adarsha Nepal Adventure 2016).

The following map (Figure 2.5) illustrates Nepal’s strategic road network; this map shows that most of the roads are located in the southern half of the country. Not only do the Himalayas prove difficult terrain for access and road building, but the Nepal/China border is also much more frequently patrolled than Nepal’s southern border with India, making transactions with China more difficult than with Nepal’s Indian neighbor.
Figure 2.5: Nepal’s strategic road network 2013/2014

The Arniko Highway, the only actual highway connecting Nepal with China, was destroyed by landslides in the 2015 earthquake and has since been deemed unusable.

2.6.2 Rural Roads Connecting Nepal to China

There are only two other minor roads in Nepal that connect to China aside from the new Humla Road: The Kathmandu Dunche Road (in Rasuwa) and The Beni Jomsom Road (in Mustang). The Kathmandu Dunche Road starts in Kathmandu and provides access to Nuwakot District and the Langtang region. It has several steep areas, and although it too was badly affected by earthquake landslides, it is (as of January 2016) being used as the main transportation route from Nepal to China. The Beni Jomsom Road is under construction but does provide access to Jomsom and Muktinath when the weather is favorable (Adarsha Nepal Adventure 2016). South of Humla in the District of Mugu, another road project is underway. If construction on the
Humla Road were to continue southwest, these roads would eventually meet (although this is the ultimate goal, no target dates have been set).  

2.7 How Rural Roads Impact Health

Numerous studies on the impacts of roads are on a national level (either conducted by governments or agencies such as the Environmental Protection Agency) and are concerned with identifying the social, environmental, and health impacts of road development projects (see Spellerberg 1998, Forman 2000, Rheindt 2003). From the anthropological standpoint, however, the road assessment literature is quite recent. The first collection of road ethnographies, *Roads and Anthropology*, edited by two pioneers in the anthropological exploration of infrastructures (Dalakoglou and Harvey), was published in 2014. Since then, Harvey and Knox (2015) have explored state formation, social relations, and emerging political economies via an assessment of highway construction in South America. Although extremely insightful, these anthropological texts provide more of a macro-scale road impact assessment, rather than a micro-level insight into how road development is potentially impacting the health of populations at the village level. Although the World Bank now includes human health as a component of the environmental impact of road construction (Tsunakawa and Hoban 1997), few studies on the health effects of roads exist (Eisenberg et al. 2006).

The interdisciplinary micro-level research that has been conducted on the health impacts of roads confirms that the way in which a rural road impacts a population depends entirely on the context. In terms of positive health impacts, it has been well-documented that roads shorten transportation costs, lessen travel time, and help lower the costs of both consumption and production of goods and services (Bravo 2002, Hettige 2006). For populations unable to subsist on their own agricultural yields, road development often provides greater access to food as well as access to a greater dietary diversity (Dickerson et al. 2008, Coveney and Dwyer 2009). In terms of income generation and poverty alleviation, increased road access often brings access to both telecommunication facilities and financial institutions (Rawat and Sharma 1997), both of which make nonagricultural wage labor and microcredit opportunities more feasible.

24 The interviews I conducted this past January in Nepal suggest that the Mugu Road is being built at a steady pace. This indicates that once the bridge is complete over the Karnali at Thumkhot, the Humla Road and the Mugu Road have a good chance of joining in Simikot.
One of the most frequently cited negative health impacts associated with road development is the increased rate of motorized vehicle accidents (as cited in Hang et al. 2005 (northern Vietnam), Mishra et al. 2010 (Western Nepal), and Gupta et al. 2007 (North Bengal), as operators of vehicles frequently have not received proper driving training and the quality of rural roads is often poor.

Another negative health impact of road development is the heightened risk of flooding the market with low-cost processed foods that often are ascribed a high “prestige value” by those who consider these foods “modern” and “new” (Dewey 1989, Drewnowski and Popkin 1997, Leatherman and Goodman 2005). One such study (Dickerson et al. 2008), conducted in a contemporary Tibetan township, illustrated that although dietary diversity has increased in the younger generations since the arrival of a road, so has the consumption of nutrient-poor imported processed foods.

There are also numerous studies that examine the impact of rural roads on infectious diseases. For example, a study conducted in rural Ecuador (Eisenberg et al. 2006) suggests that the prevalence of infection with pathogenic *E. coli*, rotavirus, and diarrhea was slightly higher for individuals living near or along a road compared to those living far away. The reasons for this are twofold: 1.) Deforestation causes major changes in watershed characteristics and local climate, both of which can impact the transmission of enteric pathogens, and 2.) Changing social processes, such as increased population density, can increase pathogen transmission. Along these same lines, there has also been a significant amount of research done to examine how road development increases the spread of HIV/AIDS due to changing population demographics (Pardthaisong-Chaipanich 2009).

Even though there are clearly both positive and negative health impacts of road development, current research suggests that road networks are often the most-cited need in socioeconomic development, particularly in remote and inaccessible mountain areas that are cut off from mainstream development (Rawat and Sharma 1997). However, even though roads are often cited as being needed from a development standpoint, not much is known about how a rural road actually impacts the well-being of the surrounding population.

There have been well-being-related road studies, but they tend to focus on either the impact of traffic noise on individuals’ psychosocial well-being (Ohrstrom 2004) or the well-

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25 Enteric pathogens are those that affect the intestines.
being of road workers (local and migrant) (ADB 2012). In 2002, Bravo conducted a road study in rural Peru that indicated that because roads increase productivity, they also provide individuals with more time to rest, enjoy social life, and participate in community activities.

Results from my 2013 pilot study indicate that the Humla Road has already made it easier for villagers to obtain health care. Not only has it made travel less arduous and quicker, it also has opened up access to the Chinese health facilities across the border. According to one 38-year-old woman from Upper Humla who I spoke with in 2013:

The road makes it easier to travel. Even though there are no cars, walking is easier. It seems that people go to get care earlier now (in the course of their illness) than they used to, simply because it is easier. And it does not take as much time.

Villagers reported that these positive effects are particularly helpful for the elderly and pregnant women because they now feel more comfortable traveling to seek professional health care than before, due to the ease of traveling on the road.

Because there are no guarantees or inherent mechanisms to ensure that benefits resulting from a rural road will be distributed equally among segments of the population (Hettige 2006, Jacoby 2001), it is crucial to continue assessment of how health impacts vary across villages, genders, ages, and socioeconomic statuses. My research addresses this need by examining the health impacts of the Humla Road, particularly on villagers’ food security, diet and nutrition, and subjective well-being. To do this, I implement a bio-cultural approach to health. In the following chapter, I explain in detail the theoretical framework behind my research and illuminate how I used this framework to inform my research questions and methods.
Chapter 3
Implementing a Bio-cultural Approach to Assess Socio-Structural Factors, Individual Agency, and Health Outcomes

3.1 Introduction

When infrastructural developments such as roads, bridges, and airports reach previously isolated communities, the exchange of goods within the context of the global market becomes possible (Dickerson et al. 2008). Foodstuffs that were previously inaccessible become available because access to an alternate food source is gained. In this chapter, I discuss how a structural change (the arrival of the new road), provides new opportunities for individuals to engage in new forms of food acquisition, and, based on individuals’ decision-making, may be a catalyst for changing health outcomes.

Using the bio-cultural approach to health, I investigate the extent to which villagers are choosing to substitute their traditional foodstuffs with market-purchased products for the sake of their food security or to adhere to changing values surrounding food. I additionally explore what would theoretically occur if the majority of villagers began supplementing a large portion of their diet with market-purchased food, including delocalization of the diet and the progression of the nutrition transition.

A bio-cultural approach allows me to explore the link between a socio-structural factor (the new market access in Upper Humla, Nepal), individual choice (how villagers choose to utilize the new market), and their biological health outcomes (where villagers’ nutritional status represents their objective health and their subjective well-being represents their subjective health). I draw on scholars who utilize the bio-cultural approach to illustrate how changes in human biology can be understood in broader historical, political-economic, ideological, and sociocultural contexts (Goodman and Leatherman 1998, Pelto and Pelto 2000, Popkin 2012).

To begin this chapter, I first introduce the bio-cultural approach to health by discussing its origins and applicability. I describe the political-economy-of-health model, the bio-cultural heuristic model most-often used by nutritional anthropologists, and the one I have used in this
project. I then present the new Chinese food source as a socio-structural factor, and theoretically detangle the elements involved in how villagers might react to the arrival of this structural change (attainment of food security, ascription of prestige, execution of individual agency). Using the theory of delocalization and the nutrition transition, I describe how behavior change in terms of diet may lead to biological change in terms of the arrival of diet-related noncommunicable diseases (DR-NCDs). Along with my assessment of how structure and agency may result in heterogeneous objective health outcomes, I explore the concept of resulting psychosociosomatic effects of the new road by using well-being as a proxy for villagers’ subjective health.

3.2 A Bio-cultural Approach to Health

Contemporary bio-cultural anthropologists attempt to bridge the chasm that often divides biological and cultural anthropologists by arguing that anthropology, properly construed, is not separable into constructs of the physical and the social (Khongsdier 2007, Levins and Lewontin 1998). This argument is based on the notion that culture has several key roles to play in shaping human biology:

1.) Culture in itself is a key human adaptation in that it permits individuals and populations to adapt to widely varying local ecologies (McElroy 1990).

2.) Culture influences the way individuals think, which can alter human biology by either behavior change (e.g., food choice) or more directly through psychosociosomatic effects (e.g.,

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26 In this case, scholars are referring to the physical, as it relates to the physical body, and the social, as it relates to society and culture.

27 Even within anthropology, there are numerous definitions of culture. Throughout my research, I refer back to the definition provided by Kroeber and Kluckhorn (1952): “Culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, and on the other as conditioning elements of further action.” This definition specifically applies to my research as it includes both explicit and implicit patterns, and refers to “attached values.” Both of these cultural signifiers are important to my assessment of villagers’ relationship with food. The last section of the definition, which describes culture as being both a product of action and an element of further action, resonates with my research question, which assesses how villagers respond to the new road and how their responses further dictate culturally mediated action.
stress-induced biological effects) (Hruschka et al. 2005).

3.) Culture shapes the political economy of a population, thereby influencing resource availability concerning food (e.g. food security), shelter, and health (Farmer et al. 2004, Goodman and Leatherman 1998).

The bio-cultural approach can carry a range of meanings and represent a variety of methods, research areas, and levels of analyses. Scholars have, therefore, implemented this approach in a variety of ways. For example, Leatherman (2005) implemented a bio-cultural approach to enrich biological anthropology by incorporating models from cultural anthropology and political economy; Dressler (2005) illustrated the applicability of using biological theories to explain how culture impacts the individual experience; Oths (1998) turned to a bio-cultural approach to identify the combination of factors that might account for the variation in health status among a population, and Seligman (2005) explained how psychological processes facilitate the effects of culture on human biology.

Depending on the focus of their research, anthropologists have used many different bio-cultural heuristic models, including ecological, adaptation, and political economy models. Following in the footsteps of other medical anthropologists who examined the interactions between biology and culture in relation to commercialization’s impacts on food, health, and nutrition (Crooks 1998, Daltabuit and Leatherman 1998, Dewey 1989, Himmelgreen 2002), I employed the political-economy-of-health bio-cultural model. This model provides a framework within which I can assess how a structural change (the road), impacts behavior change (in the form of diet change), and, therefore, has the ability to alter human biology (villagers’ nutritional status levels).

### 3.2.1 The Political-Economy-of-Health Model

The political-economy-of-health model has been used in various anthropological sub-fields including medical anthropology, nutritional anthropology, archaeology, human biology, and human ecology (Anderson 1990, Hvalkof and Escobar 1998, Martin 1998, Saitta 1998, Singer 1998, Thomas 1998) to assess the meaning of behavior as well as structural constructs, such as poverty and health. Contemporary scholars who apply the political economy perspective to health are concerned with understanding the conditions that shape population health within a
wider macroeconomic and political context. Specifically, proponents of this approach seek to understand how particular histories shape the everyday realities of individuals, and, moreover, how separate communities are connected through larger historical political-economic processes that affect human biology (Farmer 2006, Goodman and Leatherman 1998). The political-economy-of-health perspective holds that disease processes are generated by and embedded in social and productive relations, and, therefore, they “reject explanations of disease etiology that focus solely on the identification and treatment of pathogens…further rejecting the idea that social aspects of disease can be reduced to simple ‘risk factors’ equivalent to other epidemiologic variables” (Morgan 1998: 408).

The political-economy-of-health perspective contributes to the bio-cultural approach to health by emphasizing five interrelated issues:

1. The importance of examining biological variation in terms of social relations through which individuals gain access to basic resources and labor
2. The importance of links between the local and the global
3. The importance of history and historical contingency in understanding the direction of social change and the biological consequences of change
4. The importance of humans as active agents in their own environments
5. The importance of ideology and knowledge, of subjects and scientists alike, in understanding human action (Goodman and Leatherman 1998: 20).

3.2.2 Nutritional Anthropology and the Political-Economy-of-Health Model

Nutritional anthropology, defined as “the interplay between changes in economic systems, nutritional status, and food security, and how changes in the former affect the latter” (Pelto 2000), has relied on the political-economy-of-health perspective since its emergence in the 1970s. The majority of research in nutritional anthropology has examined the impact of diet change that arises in the wake of economic development and looked at ways to improve the diet of individuals living in developing countries (Den-Hartog and Bornstein-Johannson 1976, Drewnowski and Popkin 1997). Nutritional anthropologists have: assessed the impact of cash cropping on local food self-sufficiency (Dewey 1980), examined how changing household gender roles have affected food production and distribution (Cowan 1978), and addressed the

Nutritional anthropologists have also implemented the political-economy-of-health model to better understand the impact that social structural factors have on food choices, diet, nutrition, and health, and, in a practical sense, to solve the cultural aspects of human nutritional problems (for example, aiding health programs in overcoming cultural barriers to improved nutrition) (Freedman 1976). The social structural factors referred to by nutritional anthropologists that may impact individuals’ food choices, diet, and health include but are not limited to:

Globalization of world markets, national and state health policies, education and food policies, employment and work training opportunities, the availability of local competitive food markets, adequate transportation, access to health care, access to safe play areas, availability of physical education programs, health education, acculturation, the role that the media and advertisers have in shaping food choices, and the effects of modern technology on promoting a sedentary lifestyle (Himmelgreen 2002: 6, emphasis added).

The new road in Humla District is an example of a development initiative that has given rise to one of the aforementioned socio-structural factors “the availability of local competitive food markets.” As discussed in Chapters One and Two, the new road has already increased access to a Chinese market where villagers can now purchase enriched, processed foods such as white flour, white rice, and packaged goods at very low prices. The new food market now competes with the local market in Simikot, the capital of Humla, and with local trade and traditional agriculture as a food-sourcing option.

This social structural change has various implications regarding the following facets of villagers’ health:

1.) Food security (as the market provides an additional source for villagers to obtain calories)
2.) Diet and nutrition (as the market provides processed, enriched foods in addition to foods high in sugar)
3.) Subjective well-being (as individuals tend to capitalize on market-based opportunities in different ways, thus potentially yielding “winners” and “losers”)

3.3 Road Provides Increased Access to Market-Purchased Food

The new road in Humla District has provided villagers with increased access to consumer goods, which also includes a variety of foodstuffs that were once inaccessible to villages. Since Humla has for centuries been known as a resource-poor, food-insecure environment, this increased access is expected to increase the food security levels of some, if not all, individuals.

3.3.1 Deconstructing the Food Security Construct

As defined by the U.S. Department of Agriculture, food security includes, “The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports; access by households/individuals to adequate resources to acquire appropriate foods for a nutritious diet; and utilization of food through adequate diet, water, sanitation, and health care” (U.S Department of Agriculture 2015, emphasis added). As illustrated by this definition, the concept of food security is quite complex because it spans three dimensions: availability, access, and utilization. To theoretically understand the concept of food security, it is imperative to define each of these three food security dimensions.

“Availability” indicates that adequate quantities of food are available on a consistent basis (Coates et al. 2007). Without satisfying the availability dimension of the food security definition, there cannot be access to food. “Access” indicates that adequate resources are available to obtain the appropriate foods for a nutritious diet. The third dimension of food security, “utilization,” refers to the proper biological use of food and can be affected by “health status/illness management, food preparation, and sanitation” (Coates et al. 2007).

When the concept of food security is not unpacked to include the three aforementioned dimensions, it can easily lead to the misperception that market access automatically increases food security. While easier market access does have the potential to increase the quantity of food that households can obtain, my research additionally assesses how households’ quality-of-food related food security is shifting as a consequence of the new road by examining how road-
induced dietary shifts are impacting villagers’ nutritional status (whereby nutritional status acts, in part, as a consequence of how villagers are utilizing their food).\textsuperscript{28} Minding the three dimensions of food security allows me to make determinations about the existence of food insecurity, even in the presence of adequate amounts of food.

3.3.2 Prestige Value of Market-Purchased Foods

When market access is provided, consumer goods are purchased at a higher rate than before because of the ease of acquisition. Goods are also purchased because the arrival of market access frequently distorts the value of previously important traditional foods (Du et al., 2004, Leatherman and Goodman 2005).

The fact that human perception is culturally influenced has long been a proposition entertained by social scientists (Segall et al. 1966). How perceptions are classified in the mind, however, stems from an individual’s value system, which is often culturally mediated. This notion can be traced back to the early 1960s when Foster (1962) first outlined in his five characteristics of culture that every culture has a value system. A value can be defined as, “a standard or ideal that is prized and beneficial…it is not a desire, but defines what is desirable—a goal toward which individuals set their sights and by which they tend to judge themselves and others” (Giffit et al. 1972: 7). Foster says that as humans, we are generally not neutral in our attitude toward most of our culture’s elements. We classify items as “good” and “bad,” “desirable” and “undesirable,” and “right” and “wrong” (1962: 18). Knutson added to this by stating that behavior motivation can be best understood in terms of goals that provide some sort of added value: “security, gain, power, prestige, and the almost infinitely long list of specific wants, interests, and desires that distinguish us as social beings (1965: 204).”

Anthropologists use the phrase “prestige foods” to refer to meals or foods that are used to symbolize social status (Dickenson et al. 2008, Helman 2007). By looking at how commercially introduced goods such as foodstuffs have become luxury goods within a particular society, we

\textsuperscript{28} In Chapter Six, I present my food security data regarding villagers’ access to food. The access-related data include information on villagers’ quantity-of-food related security and their quality-of-food related security. In Chapter Seven I assess the nutrient composition of villagers’ diets using my food frequency data. I also present my anthropometric data, which can aid in assessing how villagers are utilizing their food.
can identify the process by which consumption patterns manifest themselves as modes of self-production and social empowerment (Friedman 1994). My research builds upon the notion that every culture has a value system and that often new, commercial foods are classified as prestige foods by evaluating the process by which villagers in Upper Humla do or do not ascribe prestige to the newly available Chinese market-purchased foods. Additionally, I assess whether value ascription is homogenous across and within my two field site villages, or whether there are certain segments of the population who are perhaps placing a higher value on the Chinese foods that are now easily accessible via the new road.

The act of an individual ascribing value to something can occur due to enculturation, or it can be a byproduct of an individual executing his/her individual agency. A necessary step in bridging the gap between biological and cultural theory in the context of my research is to understand the role of individual decision-making as it relates to market-purchased food acquisition, value ascription, and diet change.

3.4 Individual Agency As a Component of Market Interaction

The extension of the dialogue surrounding the individual agent as it relates to culture and society can be traced through the works of Pierre Bourdieu’s “practice theory” to Anthony Giddens’ “theory of structuration” to current anthropologists operating within a bio-cultural framework.

In Bourdieu’s practice theory, he outlines the dialectical relationship between an individual “agent,” a bounded but not determined individual who can alter structures through practice (or praxis), and “structure,” the larger, more perduring settings and conditions that result from the ongoing relationship among individuals (Dornan 2002: 305). Bourdieu frames his practice theory in terms of human resistance to accepted social patterns of inequality and focuses on social asymmetry and class as a key element of the structure-agent interaction. Bourdieu’s central concept is “habitus,” a unique schema of unconsciously internalized dispositions that determine how an individual acts in and perceives the world (Bourdieu 1972: 72). These internalized dispositions, “one’s habitus,” are both structured by and help support the structuring of external systems.

Habitus does not work independently of either agency or structure; it is, in fact, a product
of the two over time. Practice theory suggests that each person’s habitus is entirely determined by experiences outside the body or thought processes. However, habitus takes a unique form for each individual as it is comprised of a distinct combination of experiences, association with certain groups, and class affiliation. What an individual learns throughout his or her lifetime is unique to them because it is entirely conditioned by genetic capacities, past experiences, and unique perception of situations. Practice theory suggests that human thought and agency are central to human behavior, but these cognitive constructs are never considered in isolation from the social structures that shape them (Ahearn 2001). Therefore, it is suggested that the true nature of structural inequalities, a foundational concept within the political-economy-of-health model, “are placed beyond the grasp of consciousness, and hence cannot be touched by voluntary, deliberate transformation, cannot even be made explicit” (Bourdieu 1972: 94).

Bourdieu defines social class by the class habitus that is normally (i.e., with a high statistical probability) associated with that position (1979: 372). One way to conceptualize habitus within the framework of my research is to think of it in terms of an individual’s eating habits. A child is not born with food habits transmitted through genes. Children learn food habits through the process of enculturation. According to Bourdieu, individuals’ eating habits, similar to other products of enculturation, are the internalized form of the class condition; they are sensibly acquired through a lifetime and an upbringing in certain “structural” conditions. According to this Bourdieuan reasoning, one’s eating habits would simply be a manifestation of individuals tailoring their expectations and their own view of themselves to their place in a hierarchy of political power and their share in the social product.

Scholars have pointed out that Bourdieu’s practice theory tends to deny an individual the ability to take control over his or her decision-making in order to make an independent choice (Alexander 1995:184, Bohman 1999:132). Anthony Giddens for one, in his theory of structuration, emphasizes that, “human beings are neither to be treated as passive objects, nor as wholly free subjects” (1979: 150). Giddens argues that space does in fact exist for individuals to consciously access and reflect upon the content and meaning of their habituated actions. In giving more agency to individuals, Giddens breaks down the “habitus equals unconscious” equation formed by Bourdieu by “envisioning individuals as (potentially) more active in the shaping (or structuring) of the world within which they function” (Dornan 2002:307).
The fourth tenet of the political-economy-of-health perspective is that humans are active agents in their own environments (see page four for a list of all five tenets). As Seligman’s (2005) bio-cultural study of spirit possession mediumship in the Afro-Brazilian religion, Candomblé, illustrates, humans are not passive reflections of their social environment. In fact, a complex amalgamation of social, psychological, and physiological factors are involved in understanding human agency. While examining the role of human agency in making transcultural symbolic material (e.g., body image concerns) psychologically salient among teenage girls in Belize, Anderson-Fye (2003) highlights the importance of perception on directing human agency.

Building on Giddens’ theory of structuration, my research examines how the execution of individual agency regarding food consumption may or may not translate into diet change behavior. Now that villagers have access to a new food source via the new road, will everyone ascribe a higher prestige value to the market-purchased foods, or will some individuals continue to favor their locally grown food products? Additionally, my research tests Bourdieu’s habitus theory by assessing whether consumption of these so-called “prestige foods” is solely a function of villagers’ socioeconomic status (i.e. class status), or whether other variables such as access (proximity to road), gender, and age also play a significant role.

If the majority of individuals in the two field site villages, however, make the choice to replace their traditional foods with commercial foods that appeal to consumer taste and/or the consumers’ sense of status or prestige, this would essentially displace traditional, locally produced foods in diets, thus “delocalizing” them (Dickerson et al. 2008, Robinson et al. 2007).

3.5 Delocalization of Food Sources

Research from fields such as archaeology and evolutionary ecology has determined that humankind has faced shifts in both physical and dietary patterns as well as in body composition since the advent of Paleolithic humans (Konner and Eaton 2010). Half a millennium ago, however, the local populace of each region had independent responsibility for producing their food as each local food system was designed in response to ecological limits and cultural patterns (Goodman and Armelagos 2000). The general direction of transformations in food use throughout the world in the past two or three centuries, however, has involved an increasingly
rapid “delocalization” of food production and distribution. Delocalization is defined as “taking local production of food out of a local subsistence context and tying it to geographically broader market systems” (Pelto and Pelto 2000: 269).

One way to gain understanding of delocalization in matters of human food use is to consider the opposite: local autonomy. In small-scale hunting and gathering societies, such as those of the Inuit (Eskimo) or the San peoples of the Kalahari, the majority of consumed food supplies and other energy resources had to be obtained from the local environment. Before the fifteenth century, there was a slow and gradual dissemination of certain major crops and food animals into even-wider parts of the world. For example, “the wheat, barley, and dairy food complex spread into all parts of Europe, south into Africa, and eastwards into Asia, from the presumed origins in the Far East” (Pelto and Pelto 2000:271). From the point of view of a family or individual, delocalization indicates that at any one place on the globe, an increasing portion of the daily diet comes from somewhere outside the local environment, usually through commercial channels.

Until recently, many people in underdeveloped countries have been primarily dependent on locally produced food supplies that have remained largely outside the networks of commerce. Since the turn of the twentieth century, though, “delocalization” has been the driver behind cultural, livelihood, and nutritional shifts unlike any we have seen before.

3.5.1 Delocalization Precipitates Cultural Shifts

Delocalization, or commoditization of food systems,\(^2^9\) has also been known to precipitate cultural shifts, particularly in terms of disrupting a group or community’s collective identity (Fischler 1988, Melucci 1989). When food sourcing becomes commoditized, it tends to shift the acquisition of food security and dietary diversity away from integrated kinship or other reciprocal distribution networks toward being a matter of who can best capitalize on the free market to achieve optimal food-related gains (Dewey 1989). This spark in food-acquisition related competition has often been linked to breakdowns in food entitlements, which are defined

\(^{29}\) Dewey (1989) defines commoditization as a paradigm shift from one of subsistence toward one that treats food primarily as a market commodity.
as cultural or social norms that ensure food access for all members of a given social group (Leatherman and Goodman 2005, Messer et al. 2007).

In my research, I aim to identify how strong the kinship-distribution networks of food are, and whether they have become weaker in Gyepo as a result of the road. For example, do households with greenhouses share yields with other families? When an animal dies of natural causes, does the meat get distributed among villagers? These questions will help me better understand whether the road has acted as a catalyst for collective identity disruption, in addition to furthering the scholarship on the first tenet of the political-economy-of-health model, examining biological variation through social relations.

3.5.2 Delocalization Precipitates Livelihood Shifts

As economically marginalized populations become more drawn into full commercial participation, economic and political forces encourage concentration on one or two main cash crops; this is often accompanied by a deterioration of food diversity as well as a loss of local control over the food distribution system. Throughout the Himalayan region, villagers continue to rely upon traditional crop-livestock mixed farming as a component of their livelihood. They have long valued crop diversification as it has helped them secure their survival in isolated settlements that have for centuries endured a highly variable and uncertain biophysical environment (Jodha 2005).

The advent of cash cropping in this region could increase risk for villagers both economically and in terms of their food security. As part of my research, I investigated whether cash cropping or conversations regarding cash cropping had begun. If so, I was interested in who was initiating these conversations as well as what types of risks and/or gains villagers foresaw. In conjunction with encouraging cash cropping, delocalization often spurs a nutrition transition (Popkin 1994) as it severely alters the human diet.

3.5.3 Delocalization Precipitates Nutritional Shifts

A nutrition transition occurs as diets that were previously based on complex carbohydrates and fiber (derived primarily from local grains and other plant-sourced foods) are
replaced by diets with an increasing predominance of calories from refined, low-fiber grains, caloric sweeteners, and heavily processed fats such as vegetable oils (Popkin 1994, Popkin 2006, Whitney and Rolfes 2013). However, in terms of its negative dietary repercussions, delocalization disproportionately affects individuals based on where they reside and their socioeconomic status (Pelto and Pelto 2000). Throughout industrialized nations, delocalization is often associated with an increase in both the diversity and the quantity of available food imports; therefore, it has been known to improve diets. Throughout the less industrialized countries of the world, however, delocalization typically floods the market with cheap oils and fats, thus greatly increasing fat consumption among low-income nations (Drewnowski and Popkin 1997). Proponents of the bio-cultural approach to health often use the “nutrition transition” as a theoretical framework to understand the dietary shift that accompanies increased market access and the delocalization of food.

3.6 The Nutrition Transition

The nutrition transition has become a widely studied interdisciplinary (e.g., nutritional anthropology, clinical nutrition, demography, public health) global phenomenon characterized by a population abandoning their traditional diets that are high in fiber, grains, fruits, and vegetables while increasing their consumption of so-called “modern diets” that are high in fat, sugar, and salt (Madanat et al. 2008). The concept of the nutrition transition focuses on large shifts in behavior, diet, and activity patterns, particularly the structure and overall composition of these patterns. The following table (Table 3.1) illustrates the portion of the nutrition transition model that I directly assess in my research.30

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30 Barry Popkin (2006: 290), a seminal scholar of the nutrition transition, first created this nutrition transition table in 2006. Table 3.1 illustrates a segment of this original table: the ‘Diet,’ ‘Nutritional Status,’ and ‘Morbidity’ profile sections. In the complete nutrition transition table, there are also ‘Economy,’ ‘Household Production,’ ‘Income and Assets,’ ‘Demographic Profile,’ ‘Residency Patterns,’ and ‘Food Processing’ profile sections. Because these sections do not directly relate to my research, I chose to omit them.
Table 3.1: Population characteristics of the five nutrition transition patterns

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pattern 1 Collecting Food</th>
<th>Pattern 2 Famine</th>
<th>Pattern 3 Receding Famine</th>
<th>Pattern 4 Degenerative Disease</th>
<th>Pattern 5 Behavioral Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td>Plants, low-fat wild animals, varied diet</td>
<td>Cereals predominant, diet less varied</td>
<td>Fewer starchy staples; more fruit, vegetables, animal protein, low variety continues*</td>
<td>More fat (especially from animal products), sugar, processed foods; less fiber*</td>
<td>Higher-quality fats, reduced refined carbohydrates, more whole grains, fruit, vegetables</td>
</tr>
<tr>
<td>Nutritional Status</td>
<td>Robust, lean population, few nutritional deficiencies</td>
<td>Children and women suffer most from low-fat intake, nutritional deficiency diseases emerge, stature declines</td>
<td>Continued maternal and child health nutrition problems, many deficiencies disappear, weaning diseases emerge, stature grows*</td>
<td>Obesity, problems for elderly (bone health, etc.), many disabling conditions*</td>
<td>Reduction in body fat and obesity, improvement in bone health</td>
</tr>
<tr>
<td>Morbidity</td>
<td>High level of infectious disease, no epidemics</td>
<td>Epidemics, endemic disease (plague, smallpox, polio, tuberculosis) deficiency disease begins, starving common</td>
<td>Tuberculosis, smallpox infection, parasitic disease, polio, weaning diseases (diarrhea, retarded growth) expand, later decline</td>
<td>Rise in chronic disease related to diet and pollution (heart disease, cancer); decline in infectious disease</td>
<td>Increases in health promotion (preventive and therapeutic), rapid decline in cardiovascular disease, slower change in age-specific cancer profile</td>
</tr>
</tbody>
</table>

* I will be able to measure these segments of the nutrition transition using my Food Frequency Questionnaire, Nutrition Composition Software, and the results from my anthropometric measurements. I explain all of my methods more in detail in Chapter Four.

Associations between stages of the nutrition transition and historical developments are often made. However, earlier patterns are not restricted to the periods in which they first arose but continue to characterize certain geographic and socioeconomic populations (Popkin 2006). The piece of the nutrition transition that I am concerned with for my research is whether the villagers from Gyepo and Kale are engaging in dietary shifts (from Pattern Three to Pattern Four...
of the nutrition transition, see Table 3.1), as these shifts have been known to cause increasing rates of obesity and diet-related noncommunicable diseases (DR-NCD), such as cardiovascular disease, insulin-resistant diabetes, and cancers.

### 3.6.1 Diet-Related Noncommunicable Diseases

Noncommunicable diseases (NCDs) are the leading cause of death globally. In 2012, they caused 68 percent of all deaths (38 million) up from 60 percent in 2000 (WHO 2015). Roughly half of those who suffer from NCDs are women (WHO 2016). Most NCDs are considered preventable because they are caused by modifiable risk factors such as smoking, an unhealthy diet, or physical inactivity.

It is widely agreed that the increased caloric intake of processed foods, caloric sweeteners, and added sugars contribute to increasing rates of diet-related noncommunicable diseases (DR-NCDs) (Bonow and Eckel 2003, Popkin 2006, Kokkinos and Moutsatsos 2004). As the nutrition transition proceeds (from Pattern Three to Pattern Four, see Table 3.1), societies that previously suffered high rates of undernutrition and infectious diseases (e.g. Humla District, Nepal), will experience a shift in morbidity determinants to include chronic disease and other DR-NCDs (this biological shift is represented by the progression from Pattern Three to Pattern Four in the Morbidity profile, Table 3.1).

### 3.6.2 The Nutrition Transition in Underdeveloped Countries

The nutrition transition has recently been documented in some underdeveloped countries, but the effect of these changes on the nutritional profile of their populations has yet to be fully assessed (Monteiro et al. 2004, Popkin 2002). In Jordan, for example, Madanat et al. (2008) discuss how dietary changes have included a general rise in caloric intake (from an average of 2,165 daily Kcals in 1965 to an average of 3,161 daily Kcals in 1997) with an increasing percentage of energy supply coming from fats and cereals, especially for uneducated women. Rhazi et al. (2010) highlights that in North African countries, obesity is a growing problem,

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31 Although I will not be able to measure the direct causes of morbidity in Gyepo and Kale, my dietary and nutritional status data will be able to provide a good indication of whether the individuals in Gyepo and Kale village are experiencing a nutrition transition.
especially as female fatness is a cultural symbol of beauty, fertility, and prosperity. In Morocco specifically, diets high in fat and sugar were inversely associated with educational levels. In Mexico, Riosmena et al. (2012) discovered that international migration processes accelerate the nutrition transition of the sending areas because remittances lower budget constraints and allow households to increase their caloric intake and potentially reduce their caloric expense.

3.6.3 Morbidity and the ‘Double Burden of Disease’

Research has shown that oftentimes, instead of entirely shifting from infectious diseases to chronic degenerative diseases (as illustrated by the “morbidity” consequence of moving from pattern three to pattern four of the nutrition transition, shown in Table 3.1), populations simply add chronic diseases to their list of health risks. The addition of chronic disease to infectious disease has been termed in the literature the “double burden of disease” (Amuna and Zotor 2008, Boutayeb 2006). One example of where this is happening is in Pakistan, a country described by Yakoob (2012) as facing a double burden where overnutrition is present along with undernutrition. In Pakistan, foods rich in vitamins, minerals, and micro-nutrients like fruits, vegetables, nuts, and whole grains are being replaced by foods heavy in added/refined sugar, saturated fats, and salt. This has caused more than half of the disease burden in Pakistan to now be attributable to noncommunicable or chronic diseases like heart disease, stroke, type 2 diabetes, and cancers. Wealthy industrialized nations in North America and the European Union spend significant sums of money to convince their citizens to replace dietary fats with a simpler diet based on grains, vegetables, and fruit. Paradoxically, developing nations use their growing incomes to replace traditional diets, rich in fiber and grains, with diets that include a greater proportion of fats and caloric sweeteners (Drewnowski and Popkin 1997: 31, Popkin 2012).

3.6.4 Heterogeneous Movement Through the Nutrition Transition

By identifying where individuals from Gyepo and Kale village are in terms of their nutrition transition pattern characteristics (e.g. diet and nutritional status), I will be able to illustrate whether or not the arrival of the new road in Humla District is stimulating progression within the transition. I hypothesized that, due to better access and higher rates of value ascription
towards market-purchased foods, the diets of Gyepo villagers will begin to reflect a “Western diet” at a higher rate than the diet of Kale villagers. If Gyepo villagers begin to include more commercial foodstuffs in their diets, they will consequently experience a biological shift from “Pattern 3: Receding Famine” to “Pattern 4: Degenerative Disease” in the “nutritional status” characteristic of the nutrition transition. The complexity, however, lies in deciphering whether “proximity to the road” is the only significant variable in terms of diet change, or whether other variables, such as socioeconomic status, gender, and age perhaps play a more significant role in how the nutrition transition plays out in these two Himalayan villages. In Chapter Seven, I assess whether intra-village and/or intra-village variability exists in terms of how villagers are moving through the nutrition transition.

3.7 How Psychosociosomatic Effects Alter Human Biology

In addition to potentially altering individual biology through behavior change (i.e. diet change), culture may also influence biology through psychosociosomatic effects (Hruschka et al. 2005). *Somatic* or *somatization* refers to recurrent bodily complaints among persons with psychological distress that cannot be attributed to known physiological medical pathology (Kohrt et al. 2005). The term *psychosomatic* refers to conditions that have both a psychological and a physical component (e.g., stress). This term has been used to describe conditions where the origin is entirely psychological (e.g., tension headaches), or those where a physical disorder exists, but it is heightened by psychological factors (e.g., an asthma attack precipitated by a family conflict) (Helman 2007: 264). The problem with this term, however, is that it has been criticized for the mind-body dualism that it implies. The term *psychosomatic* also fails to include the role of context (cultural, social, political, or economic) in the origin, presentation, or understanding of the biological disorder. The term *psychosociosomatic* refers to human suffering that has, in part, been caused by poverty, deprivation, and/or various aspects of culture change that are key to understanding the human condition from a political economy perspective.

Medical anthropologists have long been interested in psychosociosomatic disorders, which have also been called “culture-bound disorders” or (CBDs) (Helman 2007). A CBD typically involves a specific set of symptoms that are attributed to wider sociocultural or
political-economic concerns (e.g., the sufferer’s relationship to his or her community, environment, and/or supernatural forces).

Some of the many CBDs that have been described by medical anthropologists are:

(1) *jhum jhum*: a form of numbness or tingling reported among villagers in rural Nepal (Kohrt et al. 2005),

(2) *amok*: a spree of sudden violent attacks on people, animals and inanimate objects that afflicts people in Malaysia (Kleinman 1987),

(3) *susto* (or fright): a belief in “loss of soul” throughout most of Latin America (Rubel 1964),

(4) *narahatiye qalb* (or heart distress): pounding of the heart and feelings of anxiety or unhappiness that afflicts people in Iran (Good and Good 1981).

According to Kleinman (1980), folk illnesses such as these can be “learned” in the sense that a child growing up in a particular culture leans how to respond to, and express, a range of physical or emotional symptoms or social stresses in a culturally patterned way.

The above examples of psychosociosomatic disorders or CBDs illustrate that without a focus on individuals, we cannot trace the steps by which culture shapes human biology. Therefore, a concept of culture that can help decipher variation within social groups, as well as differences among social groups, is essential to linking larger structural changes (i.e. the new road and the increased market access it provides) to human biology. Recent developments in the bio-cultural approach to health have suggested a direct link between individual health and individual adherence to given dominant cultural models (Reyes-Garcia et al. 2009).

3.7.1 Using the Cultural Consonance Model to Understand Psychosociosomatic Effects

To assess this adherence to cultural models, Dressler and colleagues have developed a theory of “cultural consonance” (Dressler 2007, Dressler and Bindon 2000). As I previously mentioned, the beliefs and behaviors of individuals will diverge from shared cultural models as a result of individual agency and social constraint; this model tests the variance between individual beliefs and behavior within a particular culture.

Cultural consonance is “the degree to which individuals approximate, in their own beliefs, and behavior, the prototypes for beliefs and behavior encoded in shared cultural models”
According to studies that examined the effects of cultural consonance, low cultural consonance is a stressful experience that often results in sustained disease, high blood pressure, and psychosociosomatic disorders (Balieiro et al. 2000, Dressler et al. 2007). Cultural consensus analysis can be conducted on any cultural domain, based on the argument that any cultural knowledge must be shared within a social group (Romney et al. 1986). Many studies have assessed the relationship between cultural consensus in material lifestyle and some physical manifestation of ill-health: Dressler and Bindon (2000) tested whether there was a correlation to arterial blood pressure among African Americans in the Southeast United States; Reyes-Garcia et al. (2009) tested whether there was a correlation to psychological well-being among people in Brazil, and McDade (2001) tested whether there was a correlation to immune function in Samoa.

My research contributes to this line of scholarship by implementing the same cultural consensus methodology but varying the cultural domain. Instead of assessing cultural consensus of material lifestyle, I use cultural consensus analysis to first create a local model of subjective well-being and then to quantify villagers’ subjective well-being levels. This allows me to test, in addition to potentially having an effect on both villagers’ food security levels and nutritional status, whether the arrival of the road is impacting villagers’ subjective health.

3.7.2 Subjective Well-Being as Proxy for Psychosociosomatic Effects

In Nepal, mental health and physical illness are not salient as separate constructs (Kohrt et al. 2005:93). Therefore, it would be inadequate and culturally inappropriate to omit subjective health measures from an assessment of health changes. Anthropological studies have shown that physical pain often reflects the events and constraints of the social space and circumstances of which they are a part (e.g., Leatherman 2005, Raghuram et al. 2000). Frequently, physical experiences of the body become modified by the social categories through which they are known, thus sustaining a particular view of society (Douglas 1982). Izquierdo’s (2005) exploration of the societal, individual, and biomedical assessments of well-being among the Matsigenka in the Amazon concluded that villagers’ subjective health status decreased, even though their objective health status improved, as a result of access to biomedicine.

Including a measurement of villagers’ subjective well-being (in addition to inquiring as to why a person has low or high feelings of well-being) is one avenue through which I will be
able to better understand how villagers are mentally coping with the culture change that is accompanying the arrival of the road. Assessing subjective well-being also allows me to determine if and why certain portions of the population are having a harder time adjusting to this culture change than others in the village(s). By incorporating both objective health measures (nutritional status) and subjective health measures (well-being and the self-reporting of psychosociosomatic effects), I can determine whether villagers’ objective health negatively or positively correlates with their subjective health.

3.8 Conclusion

A bio-cultural approach allows me to connect the arrival of a structural change with impacts on human biology by incorporating individual decision-making, choice, and individual agency into the equation. The five tenets of the political-economy-of-health model serve as a guide within which to assess how the arrival of the first road in Humla is potentially impacting villagers’ food security, diet and nutrition, and subjective well-being. Although much is known about the association among commercialization, delocalization, and the nutrition transition in many places of the world, less is known about rural ethnic Tibetans in northwest Nepal and how they are both a product of, and agents for, dietary change. By assessing elements such as collective identity, market-based competition, and prestige value ascription, this research will provide ethnographic insight into how a community incorporates the arrival of a new food source into their lives, and how it alters their culture, livelihood, and nutrition patterns. Additionally, this research adds to the scholarship on the nutrition transition by examining how progression in this transition occurs on a village level, and whether individuals (based on proximity to road, socioeconomic status, gender, and age) are moving through this transition at different paces. Based on the speed at which certain segment of the villages are moving through the nutrition transition, this research postulates whether or not villagers in Upper Humla are at risk for DR-NCDs, a set of health issues that are having a negative global impact, but for which the sociocultural causes for onset are not always fully understood.
Chapter 4
*A Mixed-Methods Approach to Assessing Villagers’ Health Outcomes*

4.1 Introduction

I conducted a ten-month ethnography in two villages in Upper Humla District, Nepal, to understand how proximity to the first road in this district has impacted villagers’ health—specifically their food security, diet and nutrition, and subjective well-being. Ethnographic research allowed me to acquire a detailed, emic account of life,\(^{32}\) as well as a nuanced understanding of the health outcome variance that exists within the villages. These variances, whether in the form of daily caloric inequities or differences in villager happiness, manifest themselves across variables such as gender, age, and socioeconomic status.

The ability to acquire such a detailed understanding of human biological and cultural variation comes in part from the very activity of the ethnographer: “a presence both involved and detached, inscribed in the instant and over time, allowing precise descriptions and multiple perspectives, thus providing a distinctive understanding of the world that deserves to be shared” (Fassin 2013:642). The strengths of ethnography lie in the ability of the ethnographer to acquire rich descriptive narratives, uncover the causes and determinants of variation, and transcend superficial connections with people previously unknown. Ethnography is focused on the small-scale, and it is, therefore, able to provide scientific descriptions and interpretations of human behavior (Riemer 2009).

The small-scale focus of ethnography, however, can also be seen as its primary weakness. Ethnography does not always lend itself to large-scale generalizations, nor is it typically associated with cross-cultural comparisons. To overcome the limitations of the ethnographic method, I implemented a variety of cross-culturally valid questionnaires and measurement techniques. I adopted a portion of these questionnaires and techniques from scholars and research

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32 Emic approaches take into account the perspectives and words of the research participants. According to Lett (1990:130), “emic constructs are accounts, descriptions, and analyses expressed in terms of the conceptual schemes and categories regarded as meaningful and appropriate by the native members of the culture whose belief and behavior are being studied.”
practitioners in the medical anthropology field, who implement these methods to assess health outcomes across populations. I also developed a portion of these methods myself, for use specifically in my field-site.

The results from these methods provided straightforward, quantifiable results, data that can be difficult to obtain through ethnography alone. Because these questionnaires and measurement techniques were developed for cross-cultural use, the execution of these secondary methods allowed me to compare the health status of villagers in Upper Humla with villagers from other parts of the world who are also engaging in similar behavior change due to a changing environment (i.e. diet change as a consequence of increased market access provided by the first road). Included in these methods are the following: focus groups, interviews, food security questionnaires, food frequency questionnaires, anthropometry, and cultural domain analysis, all of which I executed in conjunction with traditional ethnographic participant observation.

4.2 Research Design

4.2.1 Case Control Observational Study

No baseline data pertaining to villagers’ food security, diet and nutrition, and subjective well-being was available from before the road construction began. For this reason, I was unable to conduct a longitudinal study in the traditional sense, which would have resulted in metrics and outcomes associated with “change” due to the road construction. The research, however, does lend itself to future longitudinal study as it provides the baseline data for two villages for which no health data of this nature has previously been collected. It is important to note, however, that I repeatedly asked longitudinal-type questions throughout my fieldwork, such as, “How has your health changed since the arrival of the road?” These types of questions yielded responses that provided a general sense of how life in the village has changed since the road construction.

To measure how the road has impacted the health of villagers without the use of baseline data, I designed my research as an observational case-control study. This case-control design allowed me to test how “proximity to the road” impacts villagers’ health. To execute this design, I conducted fieldwork in two villages: one that lies directly on the new road (Gyepo, the case village), and one that lies on the other side of three 13,000-foot mountain passes, and, therefore
does not have direct road access (Kale, the control village). Aside from their proximity to the road, these villages are very similar: They both lie at roughly 12,000 feet and have nearly identical growing seasons, and the villagers in both are Buddhist and ethnically Tibetan.

During my fieldwork, I spent ten months moving between these two villages (with favorable weather, it took two days on foot to travel between villages). In the fall season, I was able to make three separate trips to each village. In the spring season, I visited each village twice. The reasoning behind traveling so frequently between the two villages was threefold: First, the simple act of “leaving and returning” to the village had positive impacts on my relationship with the villagers. Each time that I “returned” to their village, I was treated more like family and less like a foreign researcher.

My second reason for engaging in frequent travel pertained to the variety of my research methods, and the fact that some were more imposing than others (for example, asking about family size is much less of an imposition than measuring an individual’s arm circumference). Given the varying level of imposition of my methods, I decided to order their execution from “least imposing” to “most imposing.” Each time I returned to a village, and my rapport with the villagers strengthened, I was able to include more imposing methods and questions in my fieldwork. A more imposing question, for example, would involve asking details about life aspects that had the potential to evoke strong feelings and emotions (i.e. not having enough food to feed children or whether there were domestic disputes between family members).

The third reason behind traveling between my field sites so frequently is that I wanted the chance to experience life in each village during each month. Frequent travel allowed me to spend a portion of the harvest season, the winter months, and the cultivation season in each village. These monthly visits ensured that my participant observation included a greater variety of activities in both villages.

The following is a breakdown (for both field sites and both seasons) of how I ordered the execution of my research methods based on their level of imposition:

**Fall Season Fieldwork:**

1st visit to each village (September)
- Introductions, Interviews (Household Genealogies)
- Identifying key informants for cultural domain analysis
- 1st step in creating local model of socioeconomic status and subjective well-being (free listing exercise with key informants)
2\textsuperscript{nd} visit to each village (October)
\begin{itemize}
  \item Food Security Questionnaires, Food Frequency Questionnaires
  \item Continuation of first step in creating local model of socioeconomic status and subjective well-being (free listing exercise with key informants)
\end{itemize}

3\textsuperscript{rd} visit to each village (November)
\begin{itemize}
  \item Anthropometry
\end{itemize}

Spring Season Fieldwork:

1\textsuperscript{st} visit to each village (March–April)
\begin{itemize}
  \item Second step of creating local model of socioeconomic status and subjective well-being (ranking exercise with key informants, interviews with individuals regarding their socioeconomic and subjective well-being status)
  \item Food Security Questionnaires, Food Frequency Questionnaires
\end{itemize}

2\textsuperscript{nd} visit to each village (March – May)\textsuperscript{33}
\begin{itemize}
  \item Second step of creating local model of socioeconomic status and subjective well-being (ranking exercise with key informants, interviews with individuals regarding their socioeconomic and subjective well-being status)
  \item Food Security Questionnaires, Food Frequency Questionnaires
  \item Anthropometry
\end{itemize}

4.2.2 Sample Size

Data was collected on the village, household (defined as all people who occupy a housing unit),\textsuperscript{34} and individual level. The control village has 31 households, while the case village has 36 households (total = 67 households). I was not able to conduct interviews from two households in

\textsuperscript{33} My initial plan was to stay in the field until the end of June 2015. However, after the first earthquake hit Nepal on April 25, 2015, I decided to change my plans and return to Kathmandu earlier than I had initially scheduled (I returned in mid-May). This decision however, did not impact the data collection phase of this research project. Due to the harsh winter and heavy snowfall that Humla District experienced in the winter of 2014-2015, I was able to conduct many more interviews during the month of March, when villagers typically cultivate their crops, than I had initially expected. During March 2015, however, two feet of snow was still on the ground, and numerous snowstorms left villagers housebound. The occurrence of this long winter allowed me to spend more time with villagers in their homes conducting interviews and executing questionnaires than I initially thought was feasible.

\textsuperscript{34} I define a household as including all individuals who occupy a single housing unit (i.e. live under the same roof). Although a household typically consists of either consanguineal or affinal (which includes adopted individuals) family members, there are some cases where a family hires an employee who permanently lives with them (in these circumstances, that employee would also be considered a member of the household).
the case village. The following table illustrates the sample size obtained, as well as the unit of measure associated with each of the data collection domains.

### Table 4.1: Unit of analysis & sample size obtained from each data collection domain

<table>
<thead>
<tr>
<th>Method</th>
<th>Unit of Measure</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews (HH Genealogies)</td>
<td>Household</td>
<td>Case Village (Gyepo) = 36 HHs/237 Individuals*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control Village (Kale) = 31 HHs/225 Individuals*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100% sample in both villages</td>
</tr>
<tr>
<td>Food Security Questionnaire</td>
<td>Household</td>
<td>100% sample in control village (fall and spring), 100% sample in case village (fall), 97% sample in case village (spring)</td>
</tr>
<tr>
<td>Food Frequency Questionnaire</td>
<td>Household</td>
<td>100% sample in control village (fall and spring), 100% sample in case village (fall), 97% sample in case village (spring)</td>
</tr>
<tr>
<td>Anthropometry</td>
<td>Individual</td>
<td>Case village = 143 individual measurements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control village = 158 individual measurements</td>
</tr>
<tr>
<td>CDA**: Socioeconomic Status</td>
<td>Household</td>
<td>100% sample in both villages</td>
</tr>
<tr>
<td>CDA**: Subjective Well-Being</td>
<td>Individual</td>
<td>100% sample in both villages (100% sample indicates ≥ 1 representative per HH</td>
</tr>
</tbody>
</table>

* Only individuals who reside in the village full-time were counted in the sample size.
** CDA = Cultural Domain Analysis

Prior to conducting any of the aforementioned methods, I explained to my research participants in detail both the goals of my research and what each method would involve (the time it would take for successful execution of each method in addition to the types of questions/measurements I would be asking/taking). I obtained verbal consent from all willing participants. My research assistant bore witness to the verbal consent procedure and signed each interview form/questionnaire as a record that verbal consent was obtained. To protect my research participants’ confidentiality, I did not record any names throughout my research project. This research received Institutional Review Board approval from the University of Montana on May 1, 2014, (IRB #217-13). Additionally, this research project received approval

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35 Reasons varied for not being able to obtain structured information from these two households. In both cases, an individual who could not hear lived alone in the house. Many of the other villagers mentioned that communication would be extremely difficult, if not impossible. In one of these two cases, however, I did spend a lot of time with this head-of-household in informal settings, as he was frequently invited to my host family’s house for dinner. Some of his opinions as to the impacts of the road were captured when his daughter was also in attendance. She was the only person in the village who could properly communicate with him.

36 Throughout my dissertation, I also use pseudonyms for the village names out of respect for villagers’ confidentiality (these names were first introduced in Chapter One).
from the Nepal Health Research Council, the in-country institution tasked with overseeing all health-related research in Nepal.

4.3 Methodology for a Mixed Methods Approach

In the following sections of this chapter, I provide a detailed explanation of each method that I implemented during my ethnographic research and why I chose each particular method.

4.3.1 Participant Observation

For decades, participant observation has been the trademark method for anthropologists conducting ethnographic research. Given its frequent use, as well as the variety of different geographic regions and cultural contexts in which it has been implemented, however, numerous definitions of this method exist (see Bernard 2011, De Munck and Sobo 1998, Erlandson et al. 1993, Marshall and Rossman 1995). As a guide for my research, I use and refer back to the following definition, given by Schensul et al (1999), “the process of learning through exposure to or involvement in the day-to-day routine activities of participants in the research setting.”

The participant observation activities that I partook in during my fieldwork were: harvesting activities (including reaping, threshing, sorting, cleaning, and storing), cultivation activities (including tilling and the spreading of seeds), watching the children, and household activities (including cooking and cleaning). Engagement in these activities not only provided me with insight into life in the villages, but, given that a segment of my research is focused on food and diet, allowed me to experience firsthand many of the facets of life that I was researching.

Participating in the harvesting and cultivation activities also yielded information as to the status of villagers’ agricultural fields (types of crops, crop rotations, usage of new seed technology, reasons for land abandonment). My engagement with the domestic activities, which I normally did with other members of the household, provided a comfortable environment for villagers to discuss with me numerous topics that pertained to their health, including: how they felt physically, whether they were feeling psychologically distressed and/or having physical symptoms of ill-health, what their perceptions of the road were, and how their lives have changed over the years and differ from previous generations. The activities I engaged in that
were less participatory and more observation-intensive provided insight into numerous nuances of daily life, including, for example, how village-level decisions were made (in one such instance, I watched how micro-hydro-related work tasks in the control village get allocated by both gender and age).

Participant observation helped me identify and assess villagers’ daily successes and struggles as it provided me with everyday exposure to people’s “lived experiences” (Walker 2012). The ability to gain this insightful, emic understanding, however, was on some level highly dependent on the status and strength of my relationship to the villagers. Because the strength of my relationship with villagers varied, the amount of activities by household I was invited to participate in also varied. While some families invited me for weekly dinners (and the cooking beforehand), other families did not, which made it more difficult to establish a deeper connection. This natural acquisition of relationships and their impact on my participant observation activities might yield a bias in the field notes toward a higher percentage of notes coming from the time spent with families with whom I developed a better rapport, which can be seen as a limitation to this method of data collection.

Each day, I documented my participant observation field notes in a field notebook and informally looked for trends and themes. At the end of each week, I transcribed these notes into NVivo software. Using NVivo software, I was able to formally code my data via pertinent themes, which made it possible to identify trends across numerous variables such as “proximity to road,” “food security,” and “health” (Bernard 2003).

4.3.2 Focus Groups

A focus group is a small group (typically six to eight persons) convened, under a leader or researcher, to focus on, discuss, and thereby illuminate a particular topic (Gwynne 2003). The purpose of focus groups is to elicit information pertaining to cultural norms, individual behaviors, attitudes towards a particular concept, and/or nuances involved in the uptake of a particular innovation (in this case, the road). Focus groups are sometimes called “enhanced data collection strategies,” as they are often used to enhance or make more rigorous a study already designed as an ethnography (LeCompte and Schensul 1999). A limitation of these groups,
however, is that they often become dominated by the more extroverted individuals in the group, while the more introverted personalities tend to follow the established dominant narrative.

On various days during my ten months of ethnographic research, I conducted “informal” focus groups. These focus groups were not pre-planned; instead, they developed organically during informal conversations I was having with villagers. For example, on many afternoons I would sit with villagers on their rooftops (a common gathering place for social activities). In some cases, our conversation would turn to a topic extremely relevant to my research, such as “how the road has impacted wealth among villagers.”

When such a “conversational shift” would occur, I would begin by reading the situation, and then, if appropriate, ask whether the villagers would mind if I took some notes. If they did not mind, I proceeded to ask questions (via a set of group elicitation techniques acquired from LeCompte and Schensul 1999) that directly pertained to the topic the conversation had navigated toward. Never once did villagers object to me turning these informal gatherings into focus groups. In fact, villagers were typically enthused at the opportunity to inform me of their opinions and stories regarding their experiences and thoughts. Over the course of my fieldwork, six such “organic focus groups” emerged.

The emergence of these six focus groups provided me with a detailed, emic understanding of the following topics:

1.) The impact that the road has had on villagers’ wealth
2.) The challenges and barriers to starting a business
3.) Child feeding practices
4.) The history behind, and impacts of, the World Health Organizations’ Food for Work Project
5.) The logistics, including the dietary limitations, of living at a yak camp
6.) How child out-migration, particularly for education, has impacted family life in the villages.

These six conversations were always with adults, and perhaps understandably, with either all men or all women. The two focus group conversations that emerged with all women participants were, “child feeding practices” and “how child out-migration, particularly for education, has impacted family life in the villages.”
Similar to how I analyzed my participant observation data, I compiled the transcripts from the focus group conversations and input them into NVivo shortly after the focus group session had taken place. Following the data entry, I coded this data and extracted the relevant themes.

4.3.3 Household Genealogies via Interviews

I obtained genealogical information from each “head of household” in both villages by inquiring about both consanguine (blood relation) and affine (non-blood relation) kinship information via a set of culturally specific genealogy questions first used in Humla by McKay (1998). Many families throughout Humla District continue to practice polyandry (wherein a woman has multiple simultaneous husbands), and there were a few circumstances where a household had multiple male “heads of household.” In Humla District, if a family was engaged in a polyandrous marriage system, the woman would marry a band of brothers (see Chapter Two for more details on polyandry). There were also some cases in which another form of polygamy existed; in these cases it was polygyny (wherein a man has multiple simultaneous wives). This marriage system yielded a household dynamic where there were multiple female “heads of household.” While in my field site villages, I obtained the following genealogical information from each household:

Village Name:
Household #:
Marriage Pattern Information:
Household Head(s) (name, age):
Wife (name, age, natal village, parents’ names):
Children (name, age):
Outmigration Information (# of members who left village, purpose of leaving):

I recorded the data acquired from household genealogies into my field notebooks and subsequently input this information into Excel each week. This data formed the basis of my master spreadsheet, which housed the majority of my data. This spreadsheet was ultimately uploaded to SPSS to run the necessary statistical tests.
4.3.4 Household Food Insecurity Access Scale (HFIAS) Questionnaire

Food security is a complex, multidimensional concept, making it difficult to measure. Over the past several years, USAID’s Food and Nutrition Technical Assistance (FANTA) project has supported numerous research projects, all of which explore and test the validity of various tools that seek to measure food security in various geographical settings (Coates et al. 2007). One such tool, the Household Food Insecurity Access Scale (HFIAS) questionnaire, is the food security measurement tool that I chose to measure the status of villagers’ food security.

This method of measuring food security has been used in several countries and has proven to be a valid method of distinguishing the food secure households from the insecure across different cultural contexts (Coates et al. 2007). Its cross-cultural validity is one of its primary strengths. Analysis of the data acquired from this questionnaire allowed me to determine how the food security status of Humli villagers compared to other villagers in other parts of Nepal and abroad, as this questionnaire has been used in a multitude of geographical contexts.

I executed the HFIAS questionnaire with each head of household in both villages twice, once per season. The reason I executed the questionnaire twice per household in the different seasons was to investigate whether a relationship existed between agricultural seasons and villagers’ food security.

The HFIAS instrument represents universal domains of the household food insecurity access experience. Another strength of this method is that it allows me to successfully measure the impact of an intervention (in this case, the arrival of the new road) on the access component of household food insecurity. The HFIAS questionnaire is comprised of the following nine questions, which are asked of each respondent to recall for a period of four weeks (thirty days):
Nine Questions Included on the HFIAS:

1. In the past four weeks, did you worry that your household would not have enough food?
2. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?
4. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?
5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?
6. In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?
7. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?
8. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?
9. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?

The respondent is first asked whether or not the condition in the question happened at all in the past thirty days. If the respondent answers “no,” that question is scored with a “0.” If the respondent answers “yes,” a frequency-of-occurrence question is then asked to determine whether the condition happened “rarely” (1 to 2 times), “sometimes” (3 to 10 times), or “often” (more than ten times) during the last thirty days. If the respondent answers rarely, that particular question is scored a “1”; if the respondent answers sometimes, that particular question is scored a “2”; and if the respondent answers often, that particular question is scored a “3.” All households are therefore scored from 0 to 27, with a score of a 0 representing households that are very food secure, and a score of a 27 representing households that are very food insecure.

The ability to elicit both quantitative and qualitative data from the HFIAS is instrumental to its usefulness. Not only can I assign households along a continuum of severity (from food secure to severely food insecure), but often, as I asked the aforementioned questions, I would obtain rich ethnographic narratives from the respondent with regard to the question I was asking in addition to a simple “yes” or “no” response. For example, in one instance when I asked question No. 9, I was given a firsthand account of how a teenage boy did not eat for a twenty-four-hour period while he was high up in the mountains taking his family’s cattle to graze. While he was in the mountains, the weather turned, and he was not able to procure food for some time. He explained to me that, although not eating for a twenty-four-hour period was not a regular
occurrence, unusual circumstances do arise when individuals may face food-insecure situations when taking their cattle to graze. Although this teenager’s account is atypical of the food security situation at most grazing camps, it does highlight that unique ethnographic details can come as a result of executing the HFIAS questionnaire.

Although the HFIAS does adequately measure the access component of food insecurity, it does not provide any information on the utilization component of food security. An important concept within the utilization component of food security is nutritional quality of food. Incorporation of nutritional quality is important when assessing food security because it allows for an assessment to be made with regard to villagers’ quality-of-food related food security, in addition to simply their quantity-of-food related food security. To obtain information on the utilization component of food security and to address the limitations of the HFIAS questionnaire, I have included both anthropometry and a food frequency questionnaire in my methodology. Both of these methodological tools are able to adequately measure the utilization component of food security (Coates et al. 2007) and will help develop a holistic understanding of food security when coupled with the results from the HFIAS questionnaire.

4.3.5 Food Frequency Questionnaire

To obtain a detailed understanding of villagers’ food consumption patterns, I administered a food frequency questionnaire (FFQ). The FFQ is the most common dietary assessment tool used in population epidemiologic studies of diet and health (Zuang 2012). According to Zhuang (2012), the FFQ is the most practical and efficient method for assessing long-term dietary intakes because of its ease of administration, low cost, and ability to rank individuals according to dietary intake. Because this dietary assessment method had never been carried out in Humla District prior to this research, however, a culturally valid FFQ that fully captured all of the local food options available to Humli villagers did not exist.

To combat this problem, I designed a region-specific FFQ for Upper Humla District based on previous ethnographic accounts of the region (Bishop 1990, Führer-Haimendorf 1975, Sharma 2010, McKay 2002) and first-hand knowledge of Humli food consumption patterns. My custom FFQ includes a list of all the locally grown, traded, and market purchased foods that a person living in either of my two field site villages has the opportunity to eat (in total, this list
contains 105 food and drink items).\textsuperscript{37} I organized the items on the list via the following categories: carbohydrates, proteins, dairy, vegetables/fruits, lipids, and “other.” The “other” category includes foods/drinks such as soda pop, alcohol, candy, chocolate, and spices.

I administered the FFQ to the person responsible for cooking the majority of the meals in each household in both villages. Given this selection criterion, respondents were most often women, but some cases did exist where the respondent was male. I conducted the FFQs with the selected member of each household twice per year, once in the fall (October) and once in the spring (April). I administered the FFQs twice to accurately account for dietary fluctuations between the harvest and drought seasons. I conducted the FFQs in villagers’ homes, either while sitting around the hearth or on the rooftop. Typically, each FFQ took roughly one hour to administer. I asked the respondents whether they consumed each of the foods/drinks on the list during the last three months, and if so, how often. The reason I asked respondents to think back ninety days is that this method, unlike a twenty-four-hour dietary recall, accounts for the fact that a person might not consume each item daily. Even if a respondent only consumes meat, for example, once per month, the FFQ data will still reflect this dietary diversity. As to the frequency of consumption, respondents have the option of answering that they consumed the food/drink “daily,” “3 to 4 times per week,” “once per week,” “2 to 3 times per month,” “once per month,” or “never.” To gauge the quantity of food and/or drink consumed, I showed respondents a set of pictures (see Figure 4.1) from which they could decipher how much of each food and liquid was consumed.

\textsuperscript{37} The FFQ Questionnaire is attached as an Appendix (A4.1)
Figure 4.1: Using pictures to measure serving size: This image was shown to all of the informants who responded to the FFQ; respondents had the option of using either the plates or the bowls to help them choose the serving size. “A” = ¼ cup of food, “B” = ½ cup of food, “C” = 1 cup of food, “D” = 2 cups of food © Block Dietary Data Systems, http://www.nutritionquest.com

I input the dietary and nutrition data I obtained via the FFQs into The Food Processor Nutrition and Fitness Software, a product designed by ESHA Research. Outputs from this software allowed me to analyze villagers’ diets on both a macro (i.e. total calories consumed per day) and micro (i.e. total Vitamin A ingested per day) scale. This data also allowed me to calculate a household dietary diversity score (HDDS) for each household.

Household dietary diversity is defined as the number of different food groups consumed over a given reference period (Swindale and Bilinsky 2006). It is a valid proxy indicator because a more diversified diet is:
a.) An important outcome in and of itself
b.) Associated with a number of improved outcomes in areas such as birth weight, child anthropometric status, and improved hemoglobin concentrations
c.) Is highly correlated with such factors such as caloric and protein adequacy, percentage of protein from animal sources (high quality protein), and household income (Hodinott and Yohannes 2002).

To obtain the HDDS for each household, I calculated the number of food groups consumed daily using the data that was obtained via the FFQ. I used the following set of twelve food groups, derived from the U.N. Food and Agriculture Organization, to calculate HDDS:

A. Cereals                     G. Fish and seafood
B. Root and tubers            H. Pulses/legumes/nuts
C. Vegetables                 I. Milk and milk products
D. Fruits                     J. Oil/fats
E. Meat, poultry, offal       K. Sugar/honey
F. Eggs                       L. Miscellaneous

To tabulate the HDDS, I first calculated the HDDS variable. This was done by taking a summation of \((A+B+C+D+E+F+G+H+I+J+K+L)\); the value of the variable can be from 0 to 12, with 12 representing the highest dietary diversity possible.

4.3.6 Anthropometry

Anthropometry (or body measurements) is the most widely used method of assessing nutritional status in individuals or populations in emergency situations or in remote, resource-poor locations (UNICEF 2011). In addition to assessing and predicting the health and survival of individuals, anthropometric outcomes also reflect the economic and social well-being of populations (Cogill 2003).

I took a set of anthropometric measurements from all willing individuals in both field site villages seasonally. I took the first set of measurements in November, when households were at a high level of food security compared to other months because they had just harvested their crops. I took the second set of measurements in May, when households were experiencing low levels of food security after the winter months. Taking these measurements seasonally allowed for the
inclusion of seasonal variation in nutrition deficiencies to be captured in the data. I took the following anthropometric measurements from individuals:

1.) Height
2.) Weight
3.) Middle Upper Arm Circumference (MUAC) (adults only)
4.) Tricipital Skinfold (adults only)
5.) Subscapular Skinfold (adult males only)

Which exact anthropometric measurements I took from each individual depended on the individual’s age, and, if female, whether the woman was or recently had been pregnant. After I collected the anthropometric data, I tabulated the following information to identify three forms of growth failure (undernutrition): wasting (acute malnutrition), stunting (chronic undernutrition), and protein-energy malnutrition.

1.) Weight-for-age (underweight for a specific age)
2.) Height-for-age (stunting)
3.) Weight-for-height (acute undernutrition or wasting)
4.) Stunting (past growth failure)
5.) Wasting (current or acute malnutrition)
6.) Underweight (composite measure of stunting and wasting)

Acute malnutrition in children is a result of recent (short-term) deficiency of protein energy, minerals, and vitamins that leads to a loss of body fat and muscle tissue. Acute malnutrition presents with wasting (low weight-for-height, or weight-for-length). Chronic undernutrition reflects the cumulative effects of undernutrition and infections since and even before birth, and it presents with stunting (low height-for-age). Stunting is generally irreversible after two years of age (UNICEF 2011). On a population basis, high levels of stunting tend to be associated with poor socioeconomic conditions and increased risk of frequent and early exposure to adverse conditions such as illness and/or inappropriate feeding practices (WHO 1995). Acute malnutrition, on the other hand, is more a consequence of nutrient deficiencies experienced in the more recent past, and therefore can be used as an appropriate indicator of whether recent access to Chinese foods and the resulting diet change has had a negative impact on individuals’ nutritional status. In the following subsections, I explain in detail how and why certain anthropometric measurements were taken from each age group of individuals in both field site villages.
a.) Children 0 to 6 months

Assessment of infants’ nutritional status has relied primarily on clinical signs (e.g. bilateral oedema, visible wasting, too weak to suckle, not gaining weight despite feeding), and risk factors (e.g. insufficient breast milk, absence of mother) (UNICEF 2011). Oedema is the retention of water in the tissues of the body. Infants less than six months old are generally not measured anthropometrically, nor are there globally agreed upon anthropometric cutoff points for classification of anthropometric status. Middle Upper Arm Circumference is also not currently recommended for use in infants less than six months (ENN, UCL-CIHD, and ACF 2010). During the anthropometric phase of my research, I checked for bilateral oedema in all children zero to sixty months old. Bilateral oedema usually starts in the feet and ankles; if the pitting is not bilateral, the oedema is not of nutrition origin (UNICEF 2011). There are three grades of bilateral pitting oedema: Grade+ (Mild: both feet/ankles), Grade ++ (Moderate: both feet, plus lower legs, hands, or lower arms), and Grade+++ (Severe: generalized oedema including feet, legs, hands, arms and face). Bilateral oedema is a clinical sign of both kwashiorkor (a form of severe acute malnutrition), as well as marasmic kwashiorkor (severe wasting and bilateral oedema). To differentiate between kwashiorkor and marasmic kwashiorkor, there is a need to include explicit identification of wasting (see Table 4 for wasting cut-off points).

b.) Children 6 to 60 months

In addition to checking for the clinical signs of bilateral oedema and visible wasting, I also took both weight and height measurements for children six to sixty months old. I took these weight measurements using a spring hanging scale. Since the houses in both field site villages were built in part of wood, there was typically a place either on the exterior of the home or in the interior where it was appropriate for me to hang the hanging scale. Once I found a place to adequately hang the scale, I then suspended a pair of weighing pants from the lower hook of the scale and then readjusted the scale to zero. Then, with the help of the child’s parents or other villagers (sometimes older siblings), the child was undressed and placed in the weighing pants. Once the child and weight reading were stable, I recorded the weight to the nearest 100 grams.38

38 The SALTER scale was tested with a fixed weight regularly. If the measure did not match the weight, the scale was recalibrated.
The decision to measure height or length of a child depends on their age and physical condition. I measured height for children more than or equal to twenty-four months and measured length for children under twenty-four months (e.g. 23.9 months and below). If I did not know the exact age of the child, I measured height for children who appeared to be more than 85 cm, and measured lengths for those who appeared smaller. According to the literature, if the child is more than 85 cm though is too sick or too weak to stand up, their length instead of their height should be measured and 0.5 cm should be removed from the measurement (UNICEF 2011). No cases like this, however, appeared while I was in the field. I measured the children’s length by placing a plastic measuring mat horizontally on a flat, level surface. The following photograph (Figure 4.2) shows the plastic measuring mat as well as the hanging scale that was used.

Figure 4.2: Conducting anthropometry in Gyepo: I took this photograph in November 2014 in Gyepo. My research assistant and I took anthropometric measurements over the course of a three-day period. In this photo, we are setting up the equipment on the roof of a household.
Once the mat was in place, I ensured that the child removed his/her shoes and any head covering. I then instructed the children on how to lie on the mat (face up in the middle of the measuring mat). Prior to conducting these anthropometric measurements, I trained my research assistant to hold the sides of the child’s head and to position the head until it was touching the headboard. Once he was finished with this task, I then placed my hands on the child and firmly held his/her knees together while pressing down (at this point, the soles of the feet should be flat on the foot piece, toes pointing up at right angles). Once the child was in place, measurements were all taken to the nearest 0.1 cm. (The Mother and Child Health and Education Trust 2013).

The height of a child who is more than 85 cm was measured the same way that adult height was measured, using a calibrated stadiometer. The children were asked to stand with no shoes or hat squarely on the ground under the stadiometer. I also asked the children to remove hairpieces and/or hats in order to obtain an accurate measure. Children were positioned with their heels together, legs straight, arms at his/her sides, with their shoulders relaxed. Children were asked to inhale deeply and then stand fully erect. I ensured that the children’s heels did not ride off of the ground. The headpiece of the stadiometer was lowered perpendicularly and snugly to the crown of the participant’s head with sufficient pressure to compress the hair. To ensure an accurate reading, my eyes were parallel with the headpiece. I recorded height measurements to the nearest 0.1 cm (WHO 1995).

c.) Children and Adolescents 5 to 19 years of age

Weight and height were taken from children in this age group, in addition to the clinical signs of bilateral oedema and visible wasting. For this age group, the WHO recommends that BMI-for-age be calculated and used as an indicator for acute malnutrition, instead of simply BMI. To generate this metric, I first calculated the BMI (by taking the individual’s weight in kg, and dividing it by the square of the height in meters) and then adjusted the BMI for the age of the child (UNICEF 2011).

d.) Pregnant women and/or women up to 6 months postpartum

Women, especially during pregnancy and lactation, have long been considered a nutritionally vulnerable group. Therefore, inclusion of women of reproductive age in anthropometric surveys is increasingly common. For pregnant women of any age, MUAC is
recommended as the preferred nutritional index because it does not change significantly during pregnancy. This measurement is also preferred for women up to 6 months postpartum (UNICEF 2011). MUAC has also been found to be a good predictor of the risk of giving birth to a low birth-weight infant. MUAC was the only anthropometric measurement that I took from this demographic group. This measurement provides an index of body energy stores and protein mass (Callaway et al. 1988), as low values are interpreted as evidence of protein-energy malnutrition. To obtain the MUAC, I first determined the midpoint between the acromion (the bony protrusion on the posterior of the upper shoulder) and the olecranon process of the elbow (tip of elbow) on the left arm (Frishancho 1990). I then marked the midpoint of this distance. I then asked the women to place their arm at a relaxed position, hanging loosely at the side of the body. I then recorded the arm circumference (at the marked midpoint), and recorded the measurement to the nearest 0.1 cm.

e.) Adults > 19 years of age

Weight, height, MUAC, and two skinfold measurements were taken from the adults in both villages, in addition to the clinical signs of bilateral oedema and visible wasting. Initially, I intended on taking both a tricipital and subscapular skinfold measurement from both adult males and females. During the first anthropometric measuring session, however, it became quickly apparent to me that the women were not comfortable lifting up their shirts for me to take the subscapular measurement, even if we were in the comfort of their own homes. After noticing their discomfort, I decided to remove this anthropometric measurement from the set of indicators I would use in assessing whether the adult women in both villages are malnourished.

For adult women, I took weight, height, MUAC, and the tricipital skinfold, while for the men I was able to take all five measurements that I had initially planned to use. MUAC is a useful tool for assessing acute adult undernutrition and estimating the prevalence of undernutrition at a population level. Because this measurement requires little equipment and is easy to obtain from even the most debilitated individuals, I decided to use this measurement in conjunction with adult BMI to measure nutritional status. In those cases where an individual was too weak to stand up (which was the case for some older individuals in both study site villages), I resorted to simply obtaining their MUAC as an indicator of their nutritional status.

Skinfold measurements are the most accurate way of predicting the body composition of
individuals. Because some individuals in Humla District are eating foods high in fat (such as ramen noodles) and have added high quantities of liquor to their diet, I wanted to take some anthropometric measurements that would be able to assess whether these individuals are, or are at risk, of becoming obese. Tricep skinfolds are fair correlates to whole body adiposity, but they can be used secondarily to subscapular skinfold sites (Indian Health Service). Given this information, I decided to take both measurements whenever possible.

To take a correct tricipital skinfold measurement, I first determined the midpoint of the back of the triceps on the individual’s right arm. This midpoint is located between the top of the acromial process (top of shoulder) and the bottom of the olecranon process of the ulna (elbow) (Sicotte et al. 2010). Once I located this midpoint, I then lightly pinched the skin so that the fold was running vertically and took the skinfold measurement to the nearest 0.1 mm.

I measured the subscapular skinfold while individuals were standing straight with their shoulders relaxed and their arms hanging to both sides. I first located the inferior angle (or triangle portion) of the right scapula. Once this site was located, I marked this point with a marker. I then grasped a fold of the skin and subcutaneous adipose tissue, with my index finger directly above and my thumb reaching toward the spine. When done correctly, the skinfold should form a line about 45 degrees below the horizontal extending diagonally towards the right elbow (Fryer and Ogden 2012). The subscapular skinfold measurement was taken to the nearest 0.1 mm. I took all skinfold measurements with Lange clinical calipers.

According the WHO, the most useful measure of undernutrition in adults is still BMI; therefore, I calculated this metric for adults in both villages whenever possible. In the case of adults, the BMI is not compared to a reference population but is classified directly based on specific cutoff points (see Table 4 for cutoffs points). The following photograph depicts me taking anthropometric measurements from a woman in the control village: 39

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39 In general, villagers were extremely wiling to let me take their body measurements, especially after I explained how I was going to use the information. While all of the men were willing to have all of the aforementioned measurements taken, with the women I decided to make a few ad hoc adjustments. First, I decided to ask the women who agreed to participate whether or not they would prefer being measured outdoors on a rooftop or indoors in their homes (while all the men preferred to be measured outdoors, many women preferred to be measured in small groups indoors). Additionally, after I asked the first woman to raise her shirt so that I could measure her subscapular skinfold, I quickly realized that she felt uncomfortable; I decided on the spot to eliminate the subscapular skinfold measurement with women participants altogether.
Figure 4.3: Conducting anthropology in Kale: This photograph was taken in Kale in November 2014. In the photo, I am weighing this woman using a floor scale (which is on the stadiometer). Once I recorded weight, we removed the scale from the stadiometer, and her height was recorded using the stadiometer.
f.) Analysis of Anthropometric Measurements

I classified all anthropometric measurements into categories based on Z-score and percentile cutoffs, and subsequently compared them to the World Health Organization’s most recently published standards. Since Z-scores have the same statistical relation to the distribution of the reference around the mean at all ages, it makes the results comparable across age groups and indicators (WHO 2013). I determined the reliability of the obtained values by calculating the intra-observer error (Sicotte et al. 2010). The results determined by this analysis indicated whether or not proximity to the road in Humla impacts levels of protein-energy malnutrition, wasting, and stunting. Additionally, these results indicate intra-village variation regarding nutrition deficiencies, including but not limited to, whether or not nutritional deficiency varies by gender, age, and socioeconomic status.

Table 4.2 illustrates the exact cutoff points that indicate whether an individual is suffering from either acute malnutrition (wasting) or chronic undernutrition (stunting). Table 4.2 also illustrates how these classifications differ by age group.

| Table 4.2: Guidelines for assessing wasting and stunting by age group and method 40 |
|-----------------------------------------|---------------------------------|------------------------|------------------------|
| Age               | Indicator             | Acute Malnutrition (Wasting)               | Chronic Undernutrition (Stunting) |
|                   |                     | Moderate Acute Malnutrition | Severe Acute Malnutrition | Moderate Stunting | Severe Stunting |
| 6-60 months       | HFA, WFA            | WFH/HFA: ≥ -3 SD & < -2SD   | WFH/HFA: < -3 SD       | ≥ -2 SD to ≤ -3 SD | ≥ -3 SD |
| 5-19yrs           | BMI-for-age         | BMI-for-age: ≥ -3 SD & < -2 SD    | BMI-for-age: < -3SD   |                       |          |
| Pregnant/postpartum | MUAC              | ≥ 214mm and ≤ 221mm    | < 214 mm               |                       |          |
| Adults (≥18 years of age) | MUAC, BMI | MUAC ≤ 185; BMI <17 to ≥16kg/m | MUAC ≤ 160mm; BMI < 16kg/m |                       |          |

40 This table was created using information from: UNICEF 2011, WHO 2013, and The Mother and Child Health Education Trust 2013
4.3.7 Cultural Domain Analysis: SES and Subjective Well-Being

The final method I used as part of my ethnographic research was cultural domain analysis. I used this technique to obtain an emic, local model of both household socioeconomic status (SES) and individual subjective well-being in both field site villages. Cultural domain analysis is based on the argument that any cultural knowledge must be shared within a social group (Romney et al. 1986). In this case, the “cultural knowledge” that I was seeking information about was SES and subjective well-being. Cultural domain analysis is the first step involved in cultural consensus analysis (Dresser 2000, Dressler 2007), which is a systematic ethnographic technique used to measure the degree to which a set of key informants agree on the definition of some cultural domain.

Cultural domain analysis allowed me to work with villagers to create four separate “local models,” two per village, one for SES and one for subjective well-being. My first step involved finding a set of key informants in both villages. These two key informant group were comprised of both men and women, spanning different age groups, which, as far as I could tell, included individuals from both the wealthy and poor households (assessing “wealth” within the villages so early on in my fieldwork was merely based on informal conversations with my research assistant, as well as personal observation as to how many fields/cattle each household had, and what their houses looked like).  

Once I formed a group of key informants in each village, I asked all of the individuals to list all attributes (tangible and intangible) they included within their definition of both SES and well-being. 

To elicit this information, I conducted a free-listing exercise where I began by asking two questions:

1.) “In your village, what does it take to be socially and financially wealthy?”

41 After spending a few weeks in each field site village, I obtained sense of which households were wealthier compared to others, what age brackets villagers were in, and which villagers were the ones engaged in businesses. This demographic information that I compiled early on during my ethnography allowed me to select a wide variety of key informants from each village for my cultural domain analyses. Again, I ensured that I chose both men and women from all age groups, who, from what I could tell, represented each “wealth category” in the villages. I approached villagers informally and asked them whether they would be willing to help me construct both a “socioeconomic status” list and a “well-being” list. In all cases but one, villagers, after reviewing the consent material for their participation, agreed to be one of my “key informants” for these two particular exercises.
2.) “In your village, what does it take to be happy?”

In preparation for this initial free-listing exercise, my research assistant and I worked to translate these questions from English to Tibetan, careful to not lose the integrity of the meaning. Once this free-listing exercise was conducted with each member of the key informant group in both villages, I carefully studied the lists and removed the items that were mentioned more than once. At the end of this initial phase of the exercise, I had four lists—two per village, one for SES and one for subjective well-being. These lists formed a holistic, emic understanding for the items and attributes that were important to achieve socioeconomic status and subjective well-being in the villages.

The second step of this exercise involved making a deck of cards for each list. Each of the cards in the deck represented one item from the initial free-listing exercise and helped to facilitate the second step of the method—a ranking exercise with the key informants. Each key informant in both villages was asked to rate each item by order of importance (1=not important, 2=somewhat important, 3=very important). This ranking exercise was done twice with each key informant, once for SES and once for subjective well-being. The following photograph (Figure 4.4) depicts a gentleman in the case village participating in the ranking exercise. As was often the case, this ranking exercise was conducted on the gentleman’s roof, over yak butter tea, with some onlookers.
Figure 4.4: Conducting a ranking exercise in Gyepo: This man represents the “middle-aged,” “wealthy” subgroup of villagers in Gyepo. Using cards (with both text and pictures) to facilitate a ranking exercise is one type of participatory rural appraisal method that can be used to elicit ethnographic data.

Once each key informant had completed both ranking exercises, the mean ranking for each item on both lists was calculated using Excel. Based on the mean ranking that each item received, it was given a weight. As an example, the following table (4.3) illustrates how I assigned weights to each indicator for the SES local model in Kale based on the ranking exercises with the key informants. In table 4.3, the numbers along the top represent the 21 different indicators that the key informants in Kale collectively deemed as important to SES achievement, after the aforementioned ranking exercise elicited information regarding how much value each key informant placed on each indicator. For example, my first key informant (HH17, male, 37) indicated that card 12 had the highest value, while he ranked card six second. Table 4.3 illustrates how each of the key informants ranked all of the 21 SES indicators. Each indicator card then receives a sum value and an average ranking. For example, card one has a sum of 32
and an average ranking of five. I then distributed weights to the indicators as follows (rank #1 = 21 [because there are 21 cards, rank #2=20, rank #3=19, etc.…]). If two cards share the same rank (i.e. card one and card four both have an average ranking of five; therefore they both received a weight of 17).

<table>
<thead>
<tr>
<th>Table 4.3: Using ranking exercises to assign weight to indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INFORMANT</strong></td>
</tr>
<tr>
<td>HH17(male, 37)</td>
</tr>
<tr>
<td>HH1(female, 63)</td>
</tr>
<tr>
<td>HH27 (female, 27)</td>
</tr>
<tr>
<td>HH31(male, 29)</td>
</tr>
<tr>
<td>HH25(male, 47)</td>
</tr>
<tr>
<td>HH8(female, 37)</td>
</tr>
<tr>
<td>HH11(male, 22)</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
</tr>
<tr>
<td><strong>Average Ranking</strong></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td><strong>Card Number</strong></td>
</tr>
</tbody>
</table>

The third step in this cultural domain analysis was to ask each head of household whether they possess the items and attributes on the SES list. Since the unit of analysis for SES was the household, this task had to be done only once per household in each village (for each village, I referred to the SES list created by the key informants from that village). Once each household had completed the exercise, I tabulated how many of the items and attributes each household had. I then multiplied each item by the weight it was given (based on the ranking and weighting exercises previously described). In the end, each household was given a total score (from 100 percent indicating extremely high SES to 0 percent indicating extremely low SES). From this data, I was able to place each household in both villages in one of three categories (1=poor, 2=average wealth, 3=wealthy).

Because I measured subjective well-being on an individual level, each individual from both villages was asked whether they possessed the items and attributes on their villages’ subjective well-being list. Totals were calculated for each individual who participated in this last step of the exercise. Each individual was given a total score (from 100 percent indicating extremely high subjective well-being to 0 percent indicating extremely low subjective well-being). This cultural domain analysis allowed me to assess how strongly each household, in the case of SES, and each individual, in the case of subjective well-being, correlates with the composite SES and well-being knowledge of the group. In Chapter Five, I explain in detail the...
SES results. The subjective well-being data is presented in Chapter Eight.

4.3.8 Research Assistant

This ethnography, and the set of mixed methods that I executed, could not have been made possible without the help of my research assistant, Mr. Penpa Tsering Lama. Penpa was born and raised in a village in between my two field site villages, and therefore had some relatives and close friends in both my case and control village. His rapport within these villages made it much easier for me to establish relationships and build trust with the villagers. Penpa is fluent in the local Tibetan dialect that is spoken in Upper Humla, as well as in Nepali, Hindi, and English. With most villagers, we conducted interviews in their local Tibetan dialect, with Penpa acting as my translator. In the cases where villagers had command of the Nepali language (these were typically the men who travelled a lot for trading purposes, or the younger adults who had learned Nepali in secondary school), I was able to speak with them in Nepali. Penpa was there in case either party did not understand an aspect of the conversation. In addition to helping me with translation, Penpa was eager to learn how to enter the data we acquired into the various databases as he felt this would make him more employable in the future. I taught him the nuances of Excel, Esha Software, AnthroPlus and NVivo, and after some weeks, Penpa was able to help me enter our acquired data into the appropriate software. I additionally trained Penpa on how to appropriately take anthropometric measurements. This proved very useful, as many of these measurements (especially those involving small children), are difficult to correctly acquire without an assistant. We worked very well together with the anthropometry, which made these measurements go swiftly and efficiently in the field, which was helpful since we had to measure a high number of people. Aside from a few last minute modifications that were made during the course of my ethnography (i.e. not taking subscapular skinfold measurements from adult women), the individual methods I had planned to execute in the field went very well, though much of this success was due to Penpa’s invaluable contributions.
Chapter 5

Using Cultural Domain Analysis to Measure Villagers’ Socioeconomic Status

5.1 Introduction

As I outlined in Chapter Four, I used cultural domain analysis to obtain an emic perspective of what attributes and material possessions villagers consider valuable indicators of their socioeconomic status (SES). This method also allowed me to quantify household SES. I use this created indicator to test whether “proximity to road” is the strongest determinant of any of my three chosen health outcomes (food security, diet and nutrition, subjective well-being) or whether other indicators (for example, SES, gender, and/or presence of a greenhouse or business) play a more significant role. Given the importance of the SES indicator throughout my three results chapters (Chapters Six to Eight) and my policy recommendation chapter (Chapter Nine), I spend this chapter providing a more detailed explanation of what items and attributes constitute the SES variable, as well as offer a picture of the SES landscape of both villages.

5.2 Defining Socioeconomic Status

Indicators, defined by Bauer (1996: 1) as, “statistics, statistical series and all other forms of evidence that enable us to assess where we stand and are going with respect to our values and goals,” are important to identify from an emic perspective. They can provide a window into how current structural changes (such as the road development in Humla District) impacts the values (in this case, wealth values) of a certain population at a specific point in time.

5.2.1 Changing Indicators of Wealth

Based on my reading of the literature and conversations in Kathmandu, I initially assumed that the number of cattle a family owned was directly correlated with their SES. From the conversations I had with villagers early on in my fieldwork, I realized that one impact of the road was that it altered the value of certain assets, and, therefore, influenced traditional wealth
My husband’s family has been the wealthiest family in the village for decades. His father was the first to settle in Hilsa (the Nepali town directly on the Nepal/Tibet border). His family, now my family, owned many, many acres and many cattle. These days, having a lot of fields and cattle doesn’t mean that you are wealthy. Owning a truck means you’re wealthy. Even ten years ago owning even a few dzo (a yak-cow crossbreed) meant that you could earn an income if other families borrowed your animal and used it to transport goods and food. Now, people will hire the owner of a truck to help with the transportation of those things. It has all completely changed. Now, if you own a business, you are wealthy, and you have the opportunity.

In Gyepo, life is quickly changing because the new road is bringing increased access to Chinese markets, motorized transport, and more opportunity for businesses. Although there are only four families who own a truck in Gyepo, all the other families still travel by truck to the market in China (and pay for their ride), or pay for someone to bring foodstuffs and goods back for them. In September 2014, a local Humli villager paid 500 Nepali rupees (approximately USD$5) to catch a ride on a truck to go to the market in China. Although this does not seem very expensive in American terms, given that most families do not have a way to earn income, it is quite costly. The truck owner on the other hand, can sometimes take seven or eight passengers in the truck (as villagers also ride in the bed of the truck), making each trip to China very profitable.

According to one 22-year-old male in Gyepo, “The only time animals are used in our village for transportation is when the condition of the road is bad--when there is rock fall or landslides--this makes it impossible for trucks to pass.” In contrast, villagers in Kale still heavily rely on animals (mainly horses and dzo) for transportation. Whenever villagers travel to either the temporary market at the terminus of the road or to the market in China, they bring their animals with them to help carry all of the purchased items back to the village (See Figure 5.1):
Since the arrival of the road, it has been easier and quicker to use trucks for transportation purposes instead of animals. Thus, villagers from Gyepo are placing less value on animals than they did prior to the road’s arrival. This is just one example of how this particular structural change has impacted the value of villagers’ assets.

To explain how villagers are ascribing value to their belongings in more detail, in the following section I present the SES lists that villagers generated from the cultural domain exercise. By comparing Kale’s list to Gyepo’s list, it is possible to get a general sense of how living in closer proximity to the road influences what villagers deem as important signifiers of SES or wealth.
5.2.2 Indicators of Wealth in Kale Village

In the following table (Table 5.1), I present the SES list that villagers in Kale created. This table illustrates the tangible items and attributes that villagers deem important indicators of wealth. It also shows how they ranked these items based on order of importance, as well as what percentage of total households in the village possess each item/attribute.

<table>
<thead>
<tr>
<th>Rank*</th>
<th>Wealth Indicator</th>
<th>Percent of HH’s Possessing Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fields that produce good crops</td>
<td>77</td>
</tr>
<tr>
<td>2</td>
<td>Jewelry</td>
<td>33</td>
</tr>
<tr>
<td>2</td>
<td>High # of fields (≥10)</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>Are financially stable</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>Own business</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>High # of cattle (≥10)</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>Have 2nd household</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Have been to KTM</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Can provide employment</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Have dairy animals</td>
<td>47</td>
</tr>
<tr>
<td>6</td>
<td>No loan</td>
<td>53</td>
</tr>
<tr>
<td>6</td>
<td>Clever/Efficient</td>
<td>63</td>
</tr>
<tr>
<td>7</td>
<td>Access to tech support (i.e. greenhouse)</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Have road access</td>
<td>83</td>
</tr>
<tr>
<td>7</td>
<td>Have transportation animals</td>
<td>83</td>
</tr>
<tr>
<td>8</td>
<td>No worry</td>
<td>70</td>
</tr>
<tr>
<td>9</td>
<td>Tin roof</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Have mattress</td>
<td>70</td>
</tr>
<tr>
<td>9</td>
<td>Have proper clothing</td>
<td>93</td>
</tr>
<tr>
<td>10</td>
<td>Ability to give loan</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>Visit another country</td>
<td>10</td>
</tr>
</tbody>
</table>

*If the rank is the same, it is an indication that villagers ranked the wealth indicators as possessing an equal value.

The items on Kale’s SES list can be categorized into the following groups: agriculture-related items, financial attributes, and indicators related to Buddhist values. Interestingly,

42 I have attached a translated version (English and the local dialect of Tibetan) of Kale’s SES list in the appendix (A5.1)
however, villagers indicated that having “fields that produce good crops” is the most important indicator of wealth. Interview data suggest that because of their distance away from the road, villagers still rely heavily on their agricultural yields to maintain adequate levels of food security throughout the year. Although they do supplement their agricultural yields with food purchased from the Chinese market, because they live farther away from the road, they value agricultural productivity over all else. Many villagers told me that their biggest fear is that the snow will come too early (late October), and it will severely limit the amount of time villagers from Kale have to travel to the market. Because of the highly unpredictable weather patterns and uncertainty about how long they will have access to the road, villagers in Kale still equate wealth with having “fields that produce good crops.”

Notably, a “high number of fields” ranks second on Kale’s SES list, behind “fields that produce good crops.” Many villagers explained to me that certain areas around the village have fields that are more fertile than others (due to the aspect of the slope). Villagers separated “having a high number of fields” and “having fields that produce good crops” into two categories, because, as one 32-year-old woman stated, “Simply knowing how many fields a household has will not tell you whether they are good fields.” While only 40 percent of households reported having a high number of fields (indicated by a household having ≥10 fields), 77 percent of households did report having “fields that produce good crops.”

Villagers ranked “having a high number of cattle” as fourth on the list, and “having transportation animals” as seventh. The reason that these were two separate SES items is that some animals are not used for transportation (i.e. cows), while others are (dzos for example, is typically used for transportation). Not only are these items on the list, but they also they rank very high. Eighty-three percent of households have both cattle and transportation animals, which indicates that many families choose to invest in these assets. Only 47 percent of households, however, have dairy animals, which is important to know for the nutrition discussion around animal-sourced protein in Chapter Seven.

Although villagers included business-related items such as “are financially stable,” “own a business,” “can provide employment,” and “ability to give a loan” on their SES lists,

43 When villagers would talk about being “financially stable,” they would often reference not having any debts to anyone else in the village, in addition to having some way of earning income (i.e. an herb or timber business).
very few households have access to these items or attributes (23 percent, 23 percent, 10 percent, and 7 percent respectively).

In regard to the NGO assistance that occurs in Kale, it is telling that only 50 percent of households report “having access to technical support in terms of a greenhouse” (which ranks seventh on the list), when common discourse in Upper Humla is that all households in Kale have in fact been given this type of NGO support. This is one example of how cultural domain analyses can elicit local information on a subject that would have otherwise potentially been overlooked.

Another aspect of villagers’ opinions and thought processes that this list illuminated is the fact that “have road access” was its own category on the SES list, and that 83 percent of households in Kale claim that they do in fact have good access to the road, even though they must walk upward of a full day over a steep mountain pass to reach it. This brings up the issue of absolute versus relative access, which I discuss more in detail later in this chapter.

Like Kale’s subjective well-being list (the results of which I present in Chapter Eight), many items on the villagers’ SES list are centered on Buddhist values, such as internal calmness (“no worry” ranked eighth), and being independently motivated (“clever/efficient” ranked sixth).44

5.2.3 Indicators of Wealth in Gyepo Village

In the following table (Table 5.2), I present the SES list that villagers in Gyepo created.45 Although there are some similarities to Kale’s list, there are also some notable differences between the two lists and what villagers deem as being important indicators of SES.

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44 One evening I found myself discussing suicide with my research assistant, who is a devout Buddhist. He was explaining to me that suicide is one of the worst things a Buddhist can do. He told me that, because one has such a slim chance of being born a human, one must be very careful and attentive to what one does once they are born a human. (Buddhists believe in reincarnation based on karma—while you could be born an animal in one life, you could just as likely be born a tree in another—only if someone builds up enough good karma in previous lives will they be born a human.) He explained to me that, because human life is when wonderful things can be done to make the world a better place, taking one’s own life is like giving up the life that finally would have allowed for the betterment of the world. The item on the SES list “clever/efficient” was discussed as a trait that people have when they are really taking advantage and doing good things with the life they have been given.

45 I have attached a translated version of Gyepo’s SES list in the appendix (A5.2).
Table 5.2: Gyepo village SES indicators by rank & percentage of HHs possessing attribute

<table>
<thead>
<tr>
<th>Rank*</th>
<th>Wealth Indicators</th>
<th>Percent of HH’s Possessing Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Access to medical services</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>High # of fields (≥10)</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>High # of cattle (≥10)</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>No tension</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Hardworking</td>
<td>84</td>
</tr>
<tr>
<td>4</td>
<td>Own successful business</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>Jewelry</td>
<td>29</td>
</tr>
<tr>
<td>4</td>
<td>Can provide employment</td>
<td>35</td>
</tr>
<tr>
<td>5</td>
<td>Have no worry</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>High human capital (≥10)</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Financially stable</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>Access to organic foods</td>
<td>71</td>
</tr>
<tr>
<td>6</td>
<td>Antique memorabilia</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>Access to alcohol</td>
<td>81</td>
</tr>
</tbody>
</table>

*If the rank is the same, it is an indication that villagers ranked the wealth indicators as possessing equal amount of value.

Items on Gyepo’s SES can be categorized into similar groups as Kale’s list: agriculture-related items, financial attributes, and indicators related to Buddhist values. The highest-ranked item for SES achievement in Gyepo, however, is “access to medical services” (“health” or “medical services” was not even mentioned as a wealth indicator in Kale). Although villagers in Gyepo have the option of travelling east to Simikot, the capital of Humla District, to access medical care, they most often use the new road and obtain care across the border in China. The arrival of the road and the availability of motorized transport during certain months of the year have made access to medical services easier, more affordable, and considerably quicker, than ever before. Villagers indicated to me that those households with “access to medical services” are typically the ones who have access to transportation in the form of a motorized vehicle or at the very least have resources at their disposal to pay for the medical care.

Though a “high number of fields” and “a high number of cattle” are ranked second, villagers in Gyepo did not distinguish between “animals” and “transportation animals” as did the villagers in Kale. There was no specific mention in Gyepo about “transportation animals.”

There also was no mention of “technical support” in Gyepo’s SES list, which could have been a byproduct of there being less NGO involvement there than currently exists in Kale. Kale’s
list does, however, include various business-related items such as “own a successful business,” “can provide employment,” and “financially stable.” Notably, very few households have achieved these business-related wealth indicators. If we compare the percentage of households who “own a business” across both villages, it is clear that a slightly higher percentage of households have a business in Kale than in Gyepo (23 percent and 19 percent, respectively). Data suggest that while more households in Kale are engaged in business (they primarily gather and sell medicinal herbs), the few businesses that are successful in Gyepo (i.e. truck ownership and/or restaurant/hotel ownership) have the potential to be more lucrative.

5.2.4 Comparing Wealth Indicators Across Villages

A common theme on both villages’ SES lists was the incorporation of indicators that pertain to Buddhist philosophy such as “calmness,” “compassion,” and “contentment” (XIV Dalai Lama 2003). Key informants from both Gyepo and Kale listed SES indicators, such as “have no worry,” “no tension,” and “are hardworking and/or clever.” What this list comparison highlights, however, is that while 70 percent of households in Kale have “no worry,” a much-smaller percentage of households (58 percent) in Gyepo indicated that they did not have any worry. This difference indicates that “no worry,” although important to all villagers, is becoming harder to control and, therefore, not as common in Gyepo.

While “no worry” can be viewed as an element of Buddhist philosophy, it can also be viewed as a sign that a particular household has less economic stress and is somehow able to reduce their risk. Therefore, this “no worry” indicator can also be seen as an indication that a household is perhaps less vulnerable. If viewed as an indicator of economic vulnerability, the data suggest that more people in Kale are able to implement risk-reduction strategies, perhaps because a higher percentage of household in Gyepo are engaging in more risk by attempting to start a road-related business.

Another interesting difference between the villages’ SES lists is that while Gyepo’s list includes luxury items such as “alcohol” and “organic foods,” Kale’s list is much more centered on the acquisition of basic necessities such as “proper clothing” and “a mattress.” Eighty-one

46 According to villagers, “no worry” is an indicator that relates to one’s own internal contentment, while “no tension” is an indicator that relates more to one’s contentment with others.
percent of villagers in Gyepo reported having access to alcohol; the nutritional repercussions of both the appearance of this item on the SES list and the fact that so many households have access to this substance is further discussed in the diet and nutrition chapter (Chapter Seven). The value placed on such luxury items could be an indication that, because villagers living in Gyepo are more exposed to material goods coming from China, they are beginning to equate their wealth with material possessions more than villagers in Kale.

Another outcome of this exercise that I found interesting was that “education” did not appear on either of the villages’ SES lists. This leads me to believe that villagers do not see the direct correlation between “education” and “wealth”; this could be the result of educated children from the villages not returning to their homes once their education is complete and/or not boosting the financial stability of the household enough to make education an important indicator for household SES.

After creating these SES lists, I was able to ask each head-of-household whether his/her family did in fact possess each item and attribute on the list. Based on villagers’ responses, I calculated how many SES items each household possessed, and, based on each items’ weight (which was obtained through the ranking exercise) I determined the SES level of each household.

5.3 SES Inequality as a Function of Proximity to Road

If a household had all of the items on their villages’ SES list, their SES was considered at 100 percent. To create three separate wealth categories (poor, average, high), I transformed scale data into categorical data by splitting the percentages up into thirds. (If a household had a SES level of 0-32 percent, they were considered “poor”; if their SES level was 33-62 percent, they were considered “average”; and if their SES level was 63-100 percent of the possible score, they were considered “wealthy.”) Placing each household into a wealth category was the final step of the domain analysis.

After tabulating the results of this final step, the data indicate that SES inequity is much higher in the road village than it is in the non-road village (see Figure 5.2). While most households in Kale have an “average” SES level, signifying that there is a high level of equality,
the variance of SES in Gyepo is much higher, with many more families belonging to either the “wealthy” or “poor” categories.

![Figure 5.2: Wealth inequality in Gyepo village versus Kale village](image)

The graph indicates that wealth is distributed more equally in Kale, with only 10 percent of families considered “poor.” At the same time, only 7 percent of the households in Kale are considered “wealthy.” In contrast, Gyepo has a much higher percentage of households who are “wealthy” (29 percent), but also considerably more who are considered “poor” (16 percent).

Throughout my dissertation, especially when I discuss the determinants of health and villagers’ health outcomes, it is important to keep in mind the vast difference in wealth equality between the villages.

To illustrate this difference in wealth inequity in Gyepo village, the following two photographs are of two houses in Gyepo, the first (Figure 5.3) shows a wealthy household, and the second (Figure 5.4) shows a poor household.

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47 Important to note here is that although I am comparing the wealth distribution of Kale and Gyepo, what constitutes “wealth” or SES is different in both villages. (This indicator is based on the two separate lists that villagers created.)
In contrast, the following photograph (Figure 5.4) depicts what a poor families’ household looks like in Gyepo village.
Another variable that helps to explain the wealth inequity in Gyepo is the issue of absolute versus relative wealth. According to my interviews, this issue also provides some insight into how villagers’ see their wealth as having changed since the arrival of the road. And, given that “have road access” was an item on the Kale SES list, it is also apparent that villagers view access to road as an important part of wealth attainment.

48 Although my study was not longitudinal, I was able to gauge, based on villagers’ stories and remarks, how some aspects of life have changed since the arrival of the road.
5.3.1 Absolute Versus Relative Wealth

The concept of absolute versus relative wealth first became apparent to me after a conversation I had with a 28-year-old woman in Gyepo. Her household was slightly on the outskirts of the village, and one day, as we were discussing the arrival of the road in her village, she replied:

It is not fair. They (talking about the other villagers whose houses are located directly on the road) have great access. We have to use *dzö* (a yak-cow crossbreed used for transport) to get supplies and food from the road. I hope they will build the road over here, so that we too, have access.

To the contrary, when I asked a 32-year-old woman in Kale about what it is like to not have good road access compared to villagers who live directly on the road, she replied:

What do you mean no road access? The road is right there (points NW in the direction of the road). If the weather is good, it only takes one day to walk.

The binary opposition of these two anecdotes is a perfect example of the relationship between absolute wealth and relative wealth. In comparison to villagers in Kale, the woman in Gyepo has extremely good access to the new road. However, her perception of her level of access is relative to what others in her village have. This could help to understand why most “poor” villagers in Gyepo reported feeling “poorer” since the arrival of the road (according to interview data, 90 percent of the “poor” in Gyepo reported feeling “poorer” now than they did before the road).

Interview data suggest that the idea of one’s relative wealth decreasing is a phenomena that has disproportionately impacted the “poor” in Gyepo. In relation to other segments of the population, they perceive their status as having deteriorated, even though it might not have changed in absolute terms. This is the case because most often these villagers are measuring their wealth in relation to those few village members who have managed to capitalize on the road.
5.3.2 The Relationship Between SES and Proximity to Road

Although the aforementioned graph (Figure 5.2) illustrates that there is a difference in SES variability between the villages, I also tested, using a Pearson’s chi-squared test, whether the relationship between SES and “proximity to road” is statistically significant. This test indicates that a household’s SES is in fact dependent on its distance to the new road, \( c^2 (2, \ N=65) = 6.45, \ p = .040 \).\(^{49}\) In addition to testing for statistical significance of this relationship, I tested the validity of using the cultural domain analysis method in calculating villagers’ SES levels.

5.4 Validity of Cultural Domain Analysis in Determining SES

Ethnographic research in this region has shown that villagers typically have a very good understanding of how they are faring economically in comparison to others in their village (Bauer 2004, Haddix McKay 2002). To test the validity of using cultural domain analysis to quantitatively measure SES, I also asked each head-of-household, “Is your household poor, average, or wealthy in comparison to other households in your village?” Responses to this question yielded another indicator of household SES, which meant that I effectively had two SES metrics for each household (one obtained via my cultural domain exercise, and one obtained simply by asking each head-of-household the aforementioned question).

I then executed a Pearson’s chi-squared test to determine whether there is a statistically significant relationship between villagers’ SES scores using the two different methods. Because ethnographic research shows that villagers most often have a good understanding of what wealth category they are in, a statistically significant relationship between these two SES scores would validate the cultural domain analysis method. The results of the chi-squared test indicate that the values obtained from the two SES outcomes do not exist independently of one another, which verifies the validity of the chosen method for obtaining accurate emic SES values, \( c^2 (4, \ N=34) = 15.36, \ p = .004 \).

\(^{49}\) This shorthand indicates that the chi-squared results \( (c^2) \), with 2 degrees of freedom and a sample size \( (N) \) of 65, yielded a Pearson’s Chi Squared value rounded to the nearest two decimal places \( (6.45) \) and a significance level \( (p) \) of \( .040 \). Because this is the standard Chicago Manual of Style method of reporting statistics, I will use this format throughout the dissertation.
5.4.1 Benefits of Using the Cultural Domain Method to Measure SES

Although the aforementioned statistical test does validate the cultural domain method in assessing villagers’ SES levels, it also raises the question of why I did not just ask villagers whether they classify themselves as “poor,” “average” or “wealthy,” as it seems I could have obtained similar SES data. Although the cultural domain analysis method was very time-consuming, it elicited much more valuable information regarding village life, and how the arrival of the road is potentially impacting villagers’ daily lives. I now know what items and attributes are important to villagers in terms of what it means to be wealthy in their own village. This emic understanding, although it discredited some of my original ideas of what wealth meant in Humla, gave me a very good understanding of what villagers themselves value, in addition to providing me with SES values.

Comparing the two lists to one another also allowed me to further identify differences and similarities that could result from how closely one lives to the new road in Humla District. Additionally, this method provided data regarding how many villagers do in fact possess the items and attributes on both of the lists. Some of this information will directly be used to provide policy recommendations and recommendations to local NGOs (see Chapter Nine). Lastly, the data collected by this method can also be used as baseline data for another study in which value shifts associated with modernization and development are assessed, either in Upper Humla or in a similar circumstance where rural road development is occurring.
Chapter 6
The Effect of the Road on Villagers’ Access to Food, and The Relationship Between “Proximity to Road’ and Villagers’ Food Security

6.1 Introduction

The first road to ever be built in Humla District provides Humli villagers with easier access to a market in China. I hypothesized that this easier market access would affect the food security of villagers. In Chapter Three, I discussed the nuances of the concept of food security, and how its definition includes the availability of, access to, and utilization of food. I also addressed how food security assessments must consider both quantity-of-food and quality-of-food related food security. In this chapter, I begin my assessment of villagers’ food security by discussing their access to food. In terms of access, I hypothesized that those villagers living in closer proximity to the road (i.e. in Gyepo) would experience higher levels of overall food security than those villagers who live far removed from the road (i.e. in Kale).

\[ H_1 = \text{Villagers living in close proximity to the road (in the case village) will experience higher overall food security levels (as measured by the HFIAS questionnaire) than villagers living away from the road (in the control village) because they have easier access to Chinese markets.} \]

\[ H_0 = \text{There is no difference in food security level by proximity to the road.} \]

Although the method I chose for measuring food access (the Household Food Insecurity Access Scale Questionnaire, which I described in Chapter Four) elicits some data on villagers’ quality-of-food related food security, I assess the quality segment of the food security concept more in Chapter Seven (Diet and Nutrition). In this chapter, I limit my analysis and discussion to how villagers’ proximity to the new road is impacting their access to food, as well as the status of their quantity-of-food related food security. Using the results from the aforementioned

50 Throughout this chapter, when I discuss “food security,” it should be noted that I am always referring to villagers’ access to food, even though there are times when I do not specifically include this term.
questionnaire, as well as interviews, and focus groups, I explore both intra- and inter-village variability in food security outcomes. Using statistical analysis, I test the relationship between food security levels and various demographic, economic, and sociocultural variables to determine whether “proximity to road” is in fact the strongest predictor of household food security levels.

Although the two villages I selected for my case-control study design are very similar, there are some minor differences in their agricultural milieu, which could impact villagers’ food security levels. In the following section I describe the agricultural landscape in both villages, highlighting the similarities and differences, to point out the variables that my study cannot account for, as well as set the context for the food security analysis.

6.2 High Alpine Agriculture

An important variable to consider when assessing food security levels in high alpine environments is how many crop seasons a particular village has. Villages with two crop seasons have an easier time maintaining food security levels; if one harvest produces sub-par yields, villagers still have another harvest to fall back on. Because my two field site villages are 3,500 feet higher than the rest of the villages in the district, they are the only two villages, aside from those in Limi Valley, to only have one crop season per year. This indicates that villagers are entirely reliant on their fall harvest being successful, unless they can somehow supplement their agricultural yields. According to a 32-year-old male in Kale, “These two villages (my two field sites) are the poorest two villages in Upper Humla because they are the only ones to have one crop season…and this, too, makes them very similar.” Ethnographic narratives indicate that, in addition to making it more difficult to maintain food security levels, having only one crop season severely increases villagers’ stress and anxiety levels, and that also negatively impacts their subjective well-being (see Chapter Eight).

In addition to having only one crop season, Humlis in recent years have also had to face the impacts of climate change. According to interviews, villagers are particularly concerned that

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51 Limi Valley lies in the northwest corner of Humla District. There are three villages in this valley, each of which also has only one crop season. Limi Valley has a unique culture, however, that is different from my two field site villages. For more information, see Goldstein 1987.
weather events have become highly unpredictable and contain many more extreme events. Although the term “climate change” is not used in the local discourse, villagers certainly notice its impacts. According to one 67-year-old gentleman in Gyepo, “Lately it has been crazy—months of no rain, sometimes too much snow, sometimes it even snows during the monsoon!”

According to interviews, villagers find prolonged snowfall in the springtime and droughts in the fall the most troubling because these weather events shorten their already short growing season. Prolonged snowfall, as was the case in 2015, prevents villagers from cultivating their fields at the optimal time (mid-March); a heavy fall drought, like the ones in 2006, 2009, and 2015, does not provide crops with enough water to produce optimal yields.

The unpredictable climate is causing a higher level of uncertainty amongst villagers because they can no longer forecast the weather, as they could in previous years. These weather changes have caused both the volume and the quality of crop yields to fluctuate tremendously from year to year, and they directly correlate to villagers’ having to manage unstable food security levels.

The high alpine environment forces villagers to manage food security levels with only one crop season. The insecurity that comes as a result of this constraint is being exacerbated by climate change and the risk of a shorter growing season. This unfavorable agricultural environment also dictates two additional variables: the cultivation timeline and crop diversity, both of which I discuss in this next section.

6.2.1 High-Alpine Cultivation Timeline and Crops

Wheat, bitter buckwheat, mustard, potato, and daikon radish are successfully grown in both villages. Although the types of crops grown are nearly identical, the cultivation timeline differs slightly from village to village, due to differing microclimates. This means that the villagers in Gyepo are slightly more at risk in the case of a prolonged winter. The following seasonal calendar (Table 6.1) illustrates that villagers in Gyepo start cultivating their crops earlier (as soon as March), and they are, therefore, forced to delay their cultivation (thus shortening their growing season) in the years when snowfall continues later than expected.
### Table 6.1: Cultivation timeline for Gyepo and Kale

<table>
<thead>
<tr>
<th></th>
<th>1 T.C.*</th>
<th>2 T.C.</th>
<th>3 T.C.</th>
<th>4 T.C.</th>
<th>5 T.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feb/March</td>
<td>March/Apr</td>
<td>Apr/May</td>
<td>May/June</td>
<td>June/July</td>
</tr>
<tr>
<td><strong>Gyepo Village</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buckwheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kale Village</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barley</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buckwheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*T.C. = Tibetan Calendar

The seasonal calendar shows that most cultivation activities take place in the third month of the Tibetan Calendar (around April/May). The most notable difference between villages, however, is that Gyepo begins cultivation earlier and consequently is finished sooner. The reasoning behind this difference in the cultivation timing is that Kale lies in a slightly different microclimate where the snow, on average, takes slightly longer to melt. Because villagers in Gyepo typically begin cultivation earlier, they are more directly affected by a prolonged winter that forces them to push their cultivation timeline back. According to villagers, delayed cultivation typically creates subpar yields because the harvest date is dictated by snowfall and is not likely to change. The later villagers cultivate, the less time crops have to mature. In terms of food security, this mild difference results in villagers in Gyepo being slightly more at risk of food shortages.

The only difference in crop diversity between the villages is that barley can only grow in Kale. Although barley is most commonly known as a high-alpine crop resistant to drought and temperature fluctuations (Fisher 1987), villagers from Gyepo continually explained to me that it does not grow well in their village. Villagers from Gyepo do eat barley, however, primarily in two local Tibetan dishes: *tsampa* (a dish made from roasted barley flour) and *thukpa* (a bread soup with barley flour pieces) and/or in the local barley wine *nye chang* (these recipes are explained more in detail in Chapter Seven). Even though some other down-valley villages
oftentimes produce a surplus of barley, according to interviews, all of the barley being consumed in Gyepo is sourced from the market in China.

Another difference in the agricultural landscapes of my field site villages is that the primary, or cash crop, for each is different. This results in villagers allocating a slightly different percentage of their total land holdings to each crop. In the following table (Table 6.2), I illustrate the differences in land holdings dedicated to each cultivated crop; according to many villagers, these percentages are nearly identical across households.52

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Gyepo Village</th>
<th>Kale Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wheat, 50%</td>
<td>Bitter Buckwheat, 40%</td>
</tr>
<tr>
<td>2</td>
<td>Mustard, 25%</td>
<td>Wheat, 25%</td>
</tr>
<tr>
<td>3</td>
<td>Bitter Buckwheat, 25%</td>
<td>Barley, 25%</td>
</tr>
<tr>
<td>4</td>
<td>Barley, 0%</td>
<td>Mustard, 10%</td>
</tr>
</tbody>
</table>

Highlights represent villages’ cash crops.

The value of a villages’ cash crop is directly related to food security because it determines the likelihood of maintaining local food trade as a supplemental food source. Kale is known all over Humla District as being able to grow the tastiest bitter buckwheat; consequently, bitter buckwheat has become both their cash crop and their competitive advantage. Their bitter buckwheat is valued so highly around the region that villagers in Kale are able to trade their bitter buckwheat with individuals from the lowland villages for many foods they cannot grow in their high-alpine climate (i.e. chili peppers, red rice, and millet, to name a few). This allows them to increase their food security and heighten their dietary diversity.

It is also a very common perception in the region that the potatoes and daikon radishes from Kale taste better than from other villages in Upper Humla. This gives Kale villagers even more bargaining power as it relates to local trade because they have three local crops for which they can obtain other nutrient-rich, regionally grown foods.

In contrast, the cash crop in Gyepo is mustard seed, which villagers press into oil. The exact reasons mustard grows so well in the case village are unknown, though, according to villagers, it is believed that the success of this crop relates to the soil and climate conditions in

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52 The fact that the percentages mentioned in Table 6.2 are nearly identical across households indicates that this data is not just unique to a few households’ agriculture patterns but is representative of the agricultural pattern for the village as a whole.
their village. It is widely known however, that Gyepo produces the best mustard in all of Upper Humla. According to one elderly male in Gyepo, “Years ago our village produced so much mustard, that we were able to provide much of Tibet with the mustard that it needed…These days, however, villagers from other areas do not buy our mustard like they used to; they just go to China and buy the oil they need.”

While villagers from Gyepo cook primarily with their locally produced mustard oil, those from the other villages (including those from Kale) do not grow enough mustard seed to fulfill their oil consumption needs. Kale villagers, therefore, have to purchase the majority of their cooking oil from China. This purchasing trend not only has negative nutritional implications for those primarily consuming the market-purchased canola oil (see nutrition implications in Chapter Seven), but it reduces the demand for the cash crop in Gyepo, which makes it harder for the villagers to rely on local trade as a means to diversify their diet with other regionally grown foods. In terms of maintaining levels of food security, villagers in Kale have an advantage over those in Gyepo because of their lucrative cash crop.

Not only has the local demand for Gyepo’s mustard oil decreased, villagers talk about the quality of the mustard oil decreasing as well. Villagers in Gyepo attribute this decline to the fact that they are now using machinery in Hilsa (the Nepali village closest to the China border) to press their oil, instead of pressing it by hand as they did in years past. Even though this process produces inferior oil, according to the following anecdote from a 32-year-old man in Gyepo, the economic incentives for pressing the mustard oil in Hilsa may outweigh the declines in quality:

Since the area around here (Gyepo village) is much greener and, therefore, better for feeding cattle and horses than Hilsa, many villagers from Hilsa come over to us to graze their cattle. Since they are doing this around our village, we have a mutual understanding with one another. They let us press mustard oil using their machines for much less money than they charge other villagers, and we let them graze their cattle.

While villagers from Gyepo take their mustard seed to Hilsa to press using machinery, villagers from Kale still rely on a traditional wooden press to extract the oil from their harvested mustard seed (Figure 6.1).
When I lived in Humla, it was easy to see how the villages’ agricultural climates and their resulting cash crops can impact household food security levels. Not only do unique cultivation patterns leave villagers in Gyepo more at the mercy of unfavorable winter weather conditions, but the fact that their cash crop is seeing a decrease in demand and in quality (due to the more “modern” harvesting techniques) hinders their chances of maintaining adequate food security levels. In this next section I describe, in addition to villagers’ agricultural yields, what alternate food sourcing options (for example the Chinese market) villagers from both field sites are utilizing.
6.2.2 Agricultural Yields and Alternate Food Options

Because both villages only have one crop season, villagers must ration their agricultural yields to last throughout the entire winter, spring, and summer months. According to interview data, in both villages, agricultural yields last an average of only five months. To remain food secure for the entire year, villagers must strategically supplement their agricultural yields with foods obtained via one or more of the following sources: trading with other villagers and/or from the market in China (discussed previously) and/or finding forageable foods and greenhouse-sourced food, both which I will discuss below.

In the following table (Table 6.3) I present a list of the foods/herbs for which villagers in Gyepo and Kale most often forage. This list is by no means inclusive of all of the forageable foods in the region, but it is intended to provide a description of the forageable foods that villagers most-often discussed during my time in the field.

<table>
<thead>
<tr>
<th>Name*</th>
<th>Description</th>
<th>Optimal Foraging Month **</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pangema</td>
<td>Green in color, roots are reddish color; looks similar to spinach</td>
<td>4th or 5th month</td>
<td>Used as a spice for vegetables and added to soup broth and dumplings</td>
</tr>
<tr>
<td>Shialadok</td>
<td>Larger plant, green in color, bigger than pangeyma</td>
<td>3rd month</td>
<td>Used as a spice for vegetables and added to soup broth and dumplings</td>
</tr>
<tr>
<td>Konge</td>
<td>Looks similar to cannibas, grows along the forest floor</td>
<td>2nd or 3rd month</td>
<td>Used as flavor for dumplings and soup</td>
</tr>
<tr>
<td>Tuk Shau</td>
<td>Cauliflower shape but parts are detached</td>
<td>6th month</td>
<td>Type of mushroom used in many dishes, typically in the dumpling filling</td>
</tr>
<tr>
<td>Pang shau</td>
<td>Black in color</td>
<td>6th or 7th month</td>
<td>Type of mushroom used in many dishes</td>
</tr>
<tr>
<td>Rato shau</td>
<td>This is red morel mushroom</td>
<td>5th or 6th month</td>
<td>Type of mushroom used in many dishes (cannot find this herb in either field site village)</td>
</tr>
<tr>
<td>Gantarani</td>
<td>Looks like bark from a tree, smells delicious (herbal)</td>
<td>2nd or 3rd month</td>
<td>Used as a spice, typically in meat in dumplings; also said to help with a stomach aches</td>
</tr>
<tr>
<td>Zinbu</td>
<td>Fine slender greenish herb with distinctive smell of onion and garlic</td>
<td>2nd or 3rd month</td>
<td>Typically used as an addition to food for its fragrance; usually roasted or deep fried in oil to release aroma</td>
</tr>
<tr>
<td>Name*</td>
<td>Description</td>
<td>Optimal Foraging Month **</td>
<td>Uses</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Kangmar</td>
<td>Wild onions; very small, roots are reddish color (<em>kang</em> means foot or root and <em>mar</em> means red)</td>
<td>1st month</td>
<td>Used in a variety of dishes</td>
</tr>
<tr>
<td>Gog-lhabu</td>
<td>Greenish color, white roots</td>
<td>2nd or 3rd month</td>
<td>Used as a spice in all types of food</td>
</tr>
<tr>
<td>Tau</td>
<td>A wild root vegetable; similar to a potato but smaller</td>
<td>2nd or 3rd month</td>
<td>Grind before eating, eat just like one would a potato</td>
</tr>
</tbody>
</table>

* All of these names are in the local Tibetan dialect.

** The months indicated on this table refer to the months on the Tibetan calendar.

During a focus group, villagers explained to me that historically, food was oftentimes so scarce that they had to depend on foods for which they could simply forage (villagers often mentioned *tau* when referencing forageable foods, as this “potato” was often found in villagers fields while they were cultivating—apparently, it was not very tasty, but villagers relied on it in times of food insecurity). Now, however, villagers indicated that, because of the road and easy market access, they do not have to rely so much on foraged foods. According to a 63-year old woman in Kale, “They (foraged foods) have become more of an additive to food…a nice, familiar ingredient, but not something necessary.” Some of the forageable foods also have medicinal properties (i.e. *gantarani* helps with stomach pains), which, according to villagers, is always useful to have in the house. Both field site villages have similar forageable foods available to them.

The ability to obtain foods from a greenhouse is a relatively new development, one primarily driven by the presence of NGOs in the region. One such NGO, Adara Development Group, has worked closely with the villagers in Kale to ensure that each household has the option of building a greenhouse. Although most households did at one point build a greenhouse, the success of the endeavor is largely dependent on the interest of the household members, as one can imagine. When properly tended to, numerous crops, such as a variety of leafy greens, onions, and cilantro, can be grown successfully.

53 Interestingly, villagers told me that recently the local Rinpoche had been asking for *tau* from the villagers. Villagers laughed and told me that although they do not like the taste of *tau*, apparently the Rinpoche had been craving it, and therefore people were looking for it this past cultivation season in their fields.
The following two photographs illustrate the potential difference in greenhouse quality, from that of a family who has taken great care (Figure 6.2) to a family who has more or less abandoned the structure (Figure 6.3).

Figure 6.2: The inside of an intact, well-cared for greenhouse: This photograph, taken in March 2015, illustrates that even in cold, wintery conditions, a well-cared for greenhouse can produce a wide variety of yields. Leafy greens are the primary vegetable grown in the greenhouses.
According to villagers, the most common reason for greenhouse abandonment was that the family needed the plastic for other purposes, such as to cover a hole in their house that was leaking water. It must be noted, however, that some families seemed generally more interested in greenhouse cultivation than others.

Gyepo is also getting assistance for greenhouse construction, though through another NGO, SHIP Nepal. In contrast to the methodology of Adara Development Group, which provided the materials and technical support for all households to build a greenhouse simultaneously in the Kale, SHIP Nepal was only able to provide ten households in Gyepo with a greenhouse each year. This strategy led to the more savvy, entrepreneurial households (who in many cases were already “wealthier” than other households in the village) gaining access to greenhouses first. In terms of greenhouses becoming an alternate food source, due to the

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54 In order to gauge which households were in most need of a greenhouse in Gyepo, SHIP Nepal distributed a survey that was to be filled out by all of the households. Those households that had land facing southwest were given slight preference because the sun shines stronger on these aspects. What happened was that only those households who had literate persons were able to fill out the questionnaire in the first place. This immediately gave preference to those individuals who were literate, which was
differing strategies of the NGOs, support for villagers in Kale was more equitably distributed, which may have exacerbated the intra-village food security variability in Gyepo.

It is important, however, not to assume that because a household does not have a well-functioning greenhouse, its members are not receiving any greenhouse-produced food. Villagers are an extremely close-knit social group, with each person having many social and familial ties to other households. Because of this, many people share their greenhouse yields with their family members in other households or with close friends.

Given the variety of sources from which villagers can obtain foods to supplement their agricultural yields, I wanted to explore whether this had caused villagers to abandon any of their land. Perhaps it would demand fewer resources to purchase a higher quantity of food at the market in China than to cultivate fields on semi-arid land? Perhaps, due to outmigration of the children, it made more sense economically to let some fields go fallow? Or perhaps it was just easier and more convenient to consume a higher percentage of externally sourced food in contrast to relying solely on their agricultural yields? Land abandonment, and the underlying reasons for abandoning land, is an interesting facet of any agricultural environment, particularly one that is undergoing a structural change in the form of acquiring a new road. Better understanding these trends could illuminate the potential relationship between land abandonment and food security, as well as provide clues into the changing economic and/or social issues that villagers are facing.

In the following section, I explain in more detail if, to what extent, and why villagers from both villages have decided to abandon any of their agricultural fields. The occurrence of land abandonment is also relevant to changes in villagers’ diet and nutrition (whether processed, market-purchased food is being substituted for nutrient-dense locally grown food); though, I will discuss this subtopic in more detail in Chapter Seven. I introduce this issue now to deepen the contextual knowledge within which villagers’ current food security levels are situated.

more often than not those individuals in the village who were already doing better in terms of education and wealth (for example, according to my interviews, no single female head-of-households initially filled out this form). This selection process seemed to further exacerbate some of the inequalities that already existed within Gyepo.
6.2.3 Land Abandonment

In the following table (Table 6.4), I illustrate the percentage of households in each village who decided to abandon a portion of their land. I also show, on average, the percentage of total land holdings that villagers abandoned.

<table>
<thead>
<tr>
<th></th>
<th>Percent of HH's w/ abandoned land</th>
<th>Average percent of land abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale Village</td>
<td>47</td>
<td>32</td>
</tr>
<tr>
<td>Gyepo Village</td>
<td>42</td>
<td>30</td>
</tr>
</tbody>
</table>

The above table illustrates that a similar number of households in Kale and Gyepo abandoned a portion of their land (47 percent and 42 percent, respectively). The households in both villages who did abandon some land decided to abandon a similar percentage of their total land holdings (32 percent and 30 percent, respectively). On the surface, this negates my initial assumption that villagers living near the road would abandon a higher percentage of their land because market-purchased food is more accessible. After inquiring why villagers in each village chose to abandon a portion of their land, however, a different story came to light (and my initial assumption became more complex than I had initially intended).

Kale (as I discussed in Chapter Two) is much steeper than Gyepo. Years ago, most villagers had fields on the other side of a small river (a tributary to the Karnali river), but now villagers reported abandoning that land because it, “has become too difficult to manage.” In previous years, villagers had to walk upward of six hours on steep terrain to get to their fields on the other side of the river. Oftentimes, because of the lengthy travel time, villagers would camp for several days in the fields, so they did not have to commute back and forth each day. Villagers would make fires at night to stay warm and would bring food rations with them. During those days, it was typically a group of men from various households who would travel as a group to work in these far-away fields. They would all help each other till and cultivate the fields, one by one, until all of the fields were finished (they would engage in similar “group work” during harvest season). These days, nearly all of the villagers are cultivating only the land that is on the side of the river that they live on.
According to interviews, most households do not cultivate these far away fields for two reasons: 1.) The topography of the fields is incredibly steep, which results in numerous landslides and rock falls (many villagers have complained that the soil quality across the river is not worth the risk of working in such conditions), and 2.) There are labor shortages within the households. These days, fewer children remain in the household, and, therefore, the men simply do not have the time it takes to spend weeks per season across the river tending to those fields. When I asked him about his fields across the river, one 53-year-old man from Kale said:

We used to have twenty fields. Seven of them were over there (he pointed south across the river). It is just my wife and I, and we are old, and it is too difficult to work there now. We let them go (fallow) a few years ago. I have not been over there since.

In Gyepo, however, the reasons for land abandonment are slightly different. It is important to note that this village is very flat, and all of the fields are easy to reach, as opposed to the situation in Kale. When I asked villagers in Gyepo why they abandon their land, they said it is mainly because of two reasons: 1.) Villagers are becoming too lazy to do hard work, and 2.) Nowadays they have fewer cattle (which means they have less manure to fertilize their fields). Both reasons tell an interesting story.

In terms of field cultivation, we can look at laziness as a “luxury behavior” that is only afforded if food can easily be procured elsewhere. Even though roughly the same amount of land was abandoned in both field site villages, the fact that “laziness” was a common response in Gyepo makes my initial assumption partially true. The reasoning behind land abandonment in Gyepo was, for many households, because of easy market access creating the space for individuals to be lazy. In contrast, villagers in Kale were upset over the fact that they could no longer afford to cultivate their fields across the river due to labor shortages, though they never once mentioned to me that laziness was a potential explanation.

The second reason villagers abandoned land in Gyepo brings up the issue of value shifts. Since the arrival of the road, the value of cattle has rapidly decreased in Gyepo (as discussed in Chapter Five) because villagers are using trucks for transportation. Because of this, many people have decided to invest in alternative forms of capital or assets (i.e. trucks and/or businesses such as a restaurant or shop) and have stopped placing as much value on cattle.
This value shift has created a barrier to the agricultural livelihood. Villagers use manure from their cattle to fertilize their fields. Having fewer cattle produces less manure, which means that families cannot possibility cultivate as many fields as they could previously with more cattle. If villagers have fewer fields under cultivation, then they see an overall decline in agricultural yields. This cycle, “value shift–fewer cattle–fewer fields,” has become a reality for some households, one typically caused by villagers choosing to abandon their traditional way of life in search of an alternate lifestyle involving the use of the new road.

Other villagers in Gyepo reported abandoning their land because they did not have many fields and decided to take a risk and invest in a road-related business instead. According to one 24-year-old woman in Gyepo who no longer works in agriculture:

> Last year my husband and I decided to start a shop and small restaurant in Hilsa (the Nepali town near the Nepal/China border). It went very well. This year we let our fields go (fallow), so that we could spend more time on our new business. I hope this year is good too. We also bought a truck to make the transportation easier. We earn money by taking others (other villagers) to Taklakot (the market town across the border in China). This year, we will leave the village and spend the entire season in Hilsa working at the restaurant.

Even though the trend of land abandonment is occurring in both villages, many villagers maintain that field cultivation is extremely important. According to a 44-year-old man in Gyepo, “Even with the arrival of the road, field cultivation is extremely important…a cultivated field means food for the household.”

A better understanding of the agricultural landscape of my two field site villages provides the necessary context within which to understand the status of villagers’ access to food and their food security status. It becomes important to remember the details of this context, as certain particulars (i.e. demand for cash crops, accessibility of alternate food sources, and reasons behind land abandonment), could potentially impact food security concerns on a village level.

With these particulars in mind, in this next section, I assess villagers’ food security levels based on the results of the Household Food Insecurity Access Scale Questionnaire. The goal of this next section is to assess whether proximity to the road is the most significant predictor of food security levels or if other variables (such as seasonality, socioeconomic status, and land abandonment) are able to better predict villagers’ food security levels.
6.3 Food Security

As I described in Chapter Four, the primary method I implemented to assess villagers’ food security was the Household Food Insecurity Access Scale (HFIAS) Questionnaire. Results from this questionnaire yielded information regarding food insecurity (access) at the household level. Using this methodology, I was able to calculate four types of indicators (Coates et al. 2007) to help understand the characteristics of and changes in household food insecurity both between and within my two field site villages (in the case of my research, the changes I measured were seasonal changes in food insecurity levels). I calculated the following four indicators:

- Household Food Insecurity Access Scale Score
- Household Food Insecurity Access Prevalence
- Household Food Insecurity Access-related Domains
- Household Food Insecurity Access-related Conditions

Assessment of these four indicators yields a better understanding of how the construction of the new road has impacted villagers’ food security, and whether other variables aside from “proximity to road” play a more important role in determining food security levels.

6.3.1 Household Food Insecurity Access Scale Score (HFIAS Score)

The HFIAS Score is a continuous measure of the degree of food security (access) for the household over the past thirty days (0=food secure; 27=extremely high food insecurity). Many food insecurity scholars have cited this metric as being a valid general measure of food insecurity that can be used in both rural and urban settings (Becquey et al., 2012, Knueppel et al., 2010, Maes et al., 2009). The following graph (Figure 6.4) illustrates the mean HFIAS Score for both of my field site villages.

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55 The HFIAS Score is a continuous measure with a high score of 27 because there are nine questions on the questionnaire, and for each of the questions, the possible score is 0 to 3. If the respondent answers “no” to a question, that question is scored a “0.” If the respondent answers “yes” to a question, I followed up by asking about the frequency of the occurrence (where 1=rarely, 2=sometimes, and 3=often). For this reason, if a respondent answered “yes, often” to all nine questions, his or her score would yield a 27. This methodology is explained in more detail in Chapter Four.
These HFIAS Score results clearly show that food insecurity is more prevalent in Gyepo than in Kale (4.46 and 2, respectively). To assess the meaning behind these numbers, however, it is important to place these mean HFIAS scores in a regional context.

According to other research that implemented the HFIAS Questionnaire, populations experiencing moderate to extreme food shortages tend to have mean HFIAS scores closer to 10 to 15. For example, a study conducted with urban poor households in Mumbai, India (Chatterjee et al. 2012) acquired a mean HFIAS Score of 10.29. Two other studies, one assessing food security levels of displaced North Korean households (Lee and Nam 2014), and one assessing food security in rural areas of Limpopo province, South Africa (De Cock et al. 2013), obtained mean HFIAS scores of 10.05.

Compared to these aforementioned studies that implemented the HFIAS tool, the mean scores I acquired in Gyepo and Kale are low and a good indication that these villages in Humla, Nepal, are not experiencing high levels of food security. However, although these scores are low in relation to other groups, compared to other recent food security studies that implemented the HFIAS method in both rural Nepal and India, the mean scores I acquired from both of my field site villages are still considerably higher and thus worthy of further inquiry.

In 2013, Kular et al. executed the HFIAS questionnaire with 837 households in Dhanusha District, Nepal (located in southeastern Nepal); the mean HFIAS Score acquired was 0.69. In
2014, Srivastava et al. executed this questionnaire with 350 households in Dodhpur District, Rajasthan, India. Their results yielded a similarly low mean HFIAS Score of 0.83 and 0.90, in their two field site villages. Even though both studies reported mean HFIAS scores of <1 (which is an indication that no direct food shortage exists), researchers indicated concern, based on ethnographic narratives, that survey respondents were still subsisting off of a limited variety of foodstuffs and expected more diversity in their diets.

This comparison shows why it is imperative to better understand why the scores in Upper Humla are 2 and 4.46 respectively, and additionally, why such a difference exists between the villages’ mean scores. Additionally, it is important to assess whether there is a statistically significant relationship between “proximity to road” and villagers’ food security levels.

To test whether such a relationship exists between “proximity to road” and food security, I executed a one-way ANOVA. I turned my dependent variable (food security) into ratio form by taking an average of each household’s HFIAS Score (which controls for seasonality), and dividing it by 27 (the highest possible HFIAS Score).

Based on the results, I reject my null hypothesis ($H_0 = $ There is no difference in food security level by proximity to the road), and conclude that it is unlikely that these two samples were drawn from populations with the same means, $F(1,56) = 6.81$, $p = .012$. I have established, based on the results from the HFIAS questionnaire and this one-way ANOVA test, that “proximity to road” is a strong determinant of villagers’ food security levels.

### 6.4 Explaining the Difference in Food Security by Proximity to Road

Interview data suggest that food security is lower by the road because, in this setting, non-agricultural wages (used to buy food from the Chinese market) are less reliable than agriculture. In the beginning of this chapter, I discussed how many households in Gyepo have abandoned a portion of their land to have more time to devote to road-related opportunities such as starting a business and/or purchasing a larger quantity of food from the Chinese market.

Similar to how I presented the Chi Squared test in Chapter Five, this is the preferred format of presenting ANOVAs. ANOVAs are reported like the $t$ test, but there are two degrees-of-freedom numbers to report (in this case, 1 and 56). The $F$ statistics are then reported, rounded off to two decimal places, and the significance level. I will continue to report ANOVA results in this manner throughout this dissertation.
Although this choice has proven beneficial for some households, it has also created an environment that is more reliant on market access being good (in terms of favorable weather for clear roads) as well as each family having enough cash on hand to make the necessary food purchases. On average, villagers in Gyepo are much more reliant on non-agricultural wages to purchase food, which has decreased their overall food security.

Another variable to consider when assessing the nuances of food security in my two field site villages is seasonality. During my fieldwork, I executed the HFIAS questionnaire twice, once in the fall and once in the spring, so that I could test for differences between seasons. In the following section I provide food security data parsed out by season to answer this question.

6.4.1 The Impact of Seasonality on Food Security Levels

To assess whether there are significant seasonal differences in food security levels, I first provide this data graphically, showing villagers’ average HFIAS scores by both village and season (Figure 6.5):

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57 It is important to note that villagers are accumulating non-agricultural wages from a variety of sources. In addition to earning wages from a road-related business (i.e. a hotel and/or restaurant), villagers accumulate wages via remittances and/or when a household member is engaged in an alternate livelihood such as herb collection and/or timber harvesting and sales. Although I did collect anecdotal information about how profitable some of these wage-earning avenues are, I do not have a complete dataset that shows how much income each household is earning and via what wage-earning avenue.
Once the mean HFIAS Score results are separated by season, it becomes clear that the high food insecurity level in the harvest season (fall) partially explains why the mean HFIAS Score in Gyepo is so high.

The data show that during the harvest season (fall), villagers in Gyepo are experiencing extremely high levels of food insecurity (mean HFIAS Score = 6.77). These results are interesting, as one might assume that during the harvest season food security levels should be higher, for the simple reason that agricultural yields are ready for harvest. To explore the reasoning behind these seasonal differences in more depth, it is essential to assess the other three indicators of the HFIAS questionnaire, as they are able to provide more detailed food security information than the HFIAS Score alone.

The HFIAS dataset, however, does illuminate three important features of food security: 1.) That food security levels are higher in Kale than in Gyepo; 2.) That ‘proximity to road’ does have a statistically significant relationship with food security levels; and 3.) That seasonality is an important variable to consider when assessing food security levels in my field site villages. To further assess the nuances involved in seasonal variability of food security, I will rely on the data from the second HFIAS questionnaire indicator, Household Food Insecurity Access Prevalence (HFIAP).

HFIAP takes into account the differing severity levels for each question in the HFIAS questionnaire. By weighting the severity of the questions on the questionnaire, the results from the HFIAP will aid in a better understanding of why villagers are more food insecure in the
harvest season, in addition to what other sociocultural and economic determinants of food security should be considered.

6.4.2 Household Food Insecurity Access Prevalence (HFIAP)

The HFIAP indicator categorizes households into four food security (access) levels: food secure, and mild, moderately, and severely food insecure. Households are categorized as increasingly food secure as they respond affirmatively to more severe conditions and/or experience those conditions more often (Coates et al. 2007). Taking into account the severity of each of the conditions on the HFIAS questionnaire, the HFIAP places more weight on the more severe conditions (for example, if a household expressed worry that they did not have access to enough food, but never ran out of food, they would have a lower food insecurity prevalence than a household that expressed slight worry but where all the household members went to sleep hungry numerous times throughout the 30-day period). In the following table (Table 6.6), I define the conditions that a household is experiencing, based on their food insecurity prevalence level.

<table>
<thead>
<tr>
<th>Household Type</th>
<th>Conditions Experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Secure</td>
<td>Does not experience any food insecurity (access) conditions. May experience worry, but rarely.</td>
</tr>
<tr>
<td>Mildly Food Insecure</td>
<td>Worries about not having enough food (sometimes or often), and/or is unable to eat preferred foods, and/or eats a more monotonous diet than desired, and/or some foods are considered undesirable (this occurs rarely). Does not have to cut back on quantity of food, and does not have experience with the three most severe food insecurity conditions.</td>
</tr>
<tr>
<td>Moderately Food Insecure</td>
<td>Sacrifices food quality more frequently (i.e. more monotonous diets, undesirable foods are eaten), and/or household has cut back on quantity by reducing size of meals, and/or quantity of meals (rarely or sometimes). Household has no experience with the three most severe food insecurity conditions.</td>
</tr>
<tr>
<td>Severely Food Insecure</td>
<td>Household cuts back on meal size and quantity of meals often, and/or experiences any of the three most severe food insecurity conditions (running out of food, going to bed hungry, or going an entire day and night without eating). Even if these conditions are experienced rarely, the household is considered “severely food insecure.”</td>
</tr>
</tbody>
</table>

Source: Information was extracted from the HFIAS Indicator Guide (v.3), Coates et al. 2007
Analysis of this indicator allows for a more detailed look into the severity and food-security related outcomes that households are experiencing. The following four graphs illustrate household food security by prevalence levels across villages and seasons. Because households in Kale are experiencing, on average, lower food insecurity levels (according to the mean HFIAS Score), I will begin by assessing the existing prevalence levels in Kale. Figure 6.6 illustrates prevalence levels in the fall, while Figure 6.7 illustrates prevalence levels in the spring.

![Figure 6.6: Household food insecurity prevalence, Kale, fall, 2014 (n=29)](image)

During the fall in Kale, households were relatively well spread out among the four food insecurity prevalence levels, with only 10 percent of households at the “severely food insecure” level. The highest number of households, however (45 percent), were “moderately food insecure,” which means they are sacrificing food quality and/or cutting back on the quantity of their meals.

Only 10 percent of households in Kale are considered “severely food insecure” during the fall, which reflects that only three households had to cut back on meal size and/or experienced any of the most severe food insecurity conditions (See Table 6.5). All three of these households have low human capital (≤ two people in the HH full time who can help with tasks), and do not have a functioning greenhouse. Two of the three households do not have a successful business, whereas the third household does.

Conversations with household members of this third household yielded interesting information: Because their business is a restaurant a few days walk away from the village (situated directly on the footpath near the current terminus of the road) it is extremely busy in the
fall when many villagers are traveling to purchase goods from China. During these months, the family members who stay behind in the village have a lot of work to do (harvesting, household duties etc.) without much assistance. They do not want to consume food from the restaurant (i.e. ramen noodles, cookies, etc.) because that would create a smaller inventory that the household could potentially sell. In the spring, however, this household does quite well in terms of food security (they are mildly food secure) because they use their earned revenue from the restaurant to purchase food at the market at the terminus of the road. This particular household displays patterns of “harvest season food insecurity” and “drought season food security” similar to the households in the Gyepo who own businesses.

Even though only three households in Kale are “severely food insecure” in the fall, the overall health of the village is not optimal in terms of their food security levels. The HFIAP indicator results can also be used to calculate two categories for each village: “food secure” and “food insecure,” where [food secure = food secure households + mildly food insecure households] and [food insecure = moderately food insecure households + severely food insecure households] (Coates et al. 2007). Based on this calculation, 45 percent of households in Kale village in the fall are food secure, while 55 percent of the households are food insecure. This indicates that in the fall, Kale is essentially split in half: half of the households are food secure, and the other half is food insecure.

The following graph (Figure 6.7) illustrates the food security prevalence levels for the Kale in the spring. A comparison of these two figures (Figure 6.6 and Figure 6.7) helps to understand how food security levels change across seasons.
Figure 6.7: Household food insecurity prevalence, Kale, spring, 2015 (n=29): Compared to the fall, many more households were food secure in the spring (this number increased from 28 percent in the fall to 52 percent in the spring). Even though 38 percent of households were still experiencing 'moderate food insecurity,’ overall food security health was much higher in the spring than in the fall in Kale.

The data show that only 3 percent of households (one household) are “severely food insecure” during the spring. This particular household experienced a decrease in food security from the fall where “moderate food insecurity” was experienced. A single, female head-of-household runs this particular household; she has a very limited amount of fields, and, therefore her crops do not last long. Although the overarching narrative of this chapter indicates that, contrary to popular belief, most households are more food secure in the spring, this particular case illustrates that there are always exceptions to the rule. This single mother, in part because of lack of fields and low human capital, struggles with food insecurity year-round, particularly in the spring season.58

The decrease in “moderate food insecurity” in Kale from 45 percent in the fall to 38 percent in the spring, however, tells an interesting story. Of the 45 percent of moderately food insecure households in the fall, 46 percent either stayed at that level or experienced a higher level of food insecurity in the spring [38 percent (five HHs) stayed at that level while 8 percent (one HH) further increased their food insecurity to “severely food insecure”]. On the other hand, 54

58 In Chapter Eight I discuss how single heads-of-household receive support from other community members, and how this support often translates to higher levels of subjective well-being. However, as indicated by the food security data, this community support does not always translate into high, or even manageable, food security levels.
percent of households managed to improve their food security situation by the spring [8 percent (one HH) increased their food security level to “mildly food insecure” while 46 percent (six HHs) managed to increase to “food secure”]. This shows that slightly more than half of those who were struggling in the fall were able to attain higher food security levels by the spring, while the others are struggling year-round.

In the following two figures (Figures 6.8 and 6.9), I illustrate the food insecurity prevalence levels for Gyepo for both seasons.

Eighty-seven percent of households that live on the road are experiencing food insecurity (represented by the households that are either moderately or severely food insecure). These results certainly beg the question, “Why are so many households in Gyepo experiencing such high levels of food insecurity?” After all, these households are directly situated on the road that presumably provides them with easier access to market purchased foods. Before exploring the possible explanations for these high food insecurity levels, it is important to decipher whether these food insecurity concerns lessen in the spring or remain equally high. To assess these levels across seasons, I illustrate the food security prevalence levels for Gyepo in the spring in Figure 6.9.
Figure 6.9: Household food insecurity prevalence, Gyepo, spring, 2015 (n=31) Although 41 percent of households in the road village were ‘food secure’ in the spring, this is still less than the 52 percent of households who were food secure in the spring in Kale.

Compared to the 87 percent of households who were food insecure in the fall, only 42 percent are food insecure in the spring, which is almost a 50 percent decrease.

Analysis of the HFIAP indicator reveals more of the food security story than the HFIAS Score alone. The following table (Table 6.6), provides a summary of the HFIAP data for both villages across both seasons.

<table>
<thead>
<tr>
<th>HFIAP Category</th>
<th>Kale Fall, 2014</th>
<th>Kale Spring, 2015</th>
<th>Gyepo Fall, 2014</th>
<th>Gyepo Spring, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Secure</td>
<td>28%</td>
<td>52%</td>
<td>3%</td>
<td>41%</td>
</tr>
<tr>
<td>Mildly Food Insecure</td>
<td>17%</td>
<td>7%</td>
<td>10%</td>
<td>17%</td>
</tr>
<tr>
<td>Moderately Food Insecure</td>
<td>45%</td>
<td>38%</td>
<td>52%</td>
<td>28%</td>
</tr>
<tr>
<td>Severely Food Insecure</td>
<td>10%</td>
<td>3%</td>
<td>35%</td>
<td>14%</td>
</tr>
</tbody>
</table>

*The highlighted sections indicate which prevalence level most households are experiencing.

Interestingly, although there are intra-village differences in the percentage of households who are experiencing each level of food security, the primary finding is that during the fall, the highest percentage of households in both villages are “moderately food insecure,” while in the spring, the highest percentage of households in both villages are “food secure.”

The HFIAP indicator not only allows me to assess household food security by prevalence level, but it allows me to use the pooled indicator categories of “food secure” and “food
insecure” (see page 128, this chapter) to conduct a Pearson’s chi squared test to test for statistical significance between food security and season. Results indicate that there is a statistically significant relationship between household food security and season, \( c^2(1, N=116) = 10.113, p = .001 \). Based on these results I can determine that “seasonality” is also a predictor of household food security in addition to “proximity to road.”

Analysis of the third HFIAS Questionnaire indicator, the Household Food Insecurity Access-related Domains, allows me to examine the most common food insecurity behaviors among the households. This detailed examination could lead to the identification of other potential demographic, economic, and/or sociocultural predictors of household food security. Assessment of these domains will allow me to answer questions such as, are households primarily food insecure because they have to eat smaller meals a day? Or is it because individuals have to sacrifice the quality of the foods they are consuming? Insight into the occurrence of these food insecurity behaviors allows me to decipher whether households are experiencing more quantity-of-food-related food insecurity or quality-of-food-related food insecurity (the segment of food security that I cover in more detail in Chapter Seven), based on how individuals perceive their food security access.

6.4.3 Household Food Insecurity Access-related Domains

The three domains reflected in the HFIAS are: 1.) Anxiety and uncertainty, 2.) Insufficient quality, and 3.) Insufficient food intake and physical conditions. To calculate the prevalence of households experiencing one or more behaviors in each of these domains, a simple percentage of households who responded “yes” to domain-related questions were calculated (Coates et al. 2007) In the following table (Table 6.7), I illustrate which questions on the HFIAS questionnaire correlate to which domain.\(^{59}\)

<table>
<thead>
<tr>
<th>Access-related Domains</th>
<th>Related Questions on HFIAS Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety and Uncertainty</td>
<td>Q1</td>
</tr>
<tr>
<td>Insufficient Quality</td>
<td>Q2,Q3,Q4</td>
</tr>
<tr>
<td>Insufficient Food Intake and Physical Conditions</td>
<td>Q5, Q6, Q7, Q8, Q9</td>
</tr>
</tbody>
</table>

\(^{59}\) A complete list of the HFIAS Questionnaire questions can be found in Chapter Four.
Before presenting the current data on the prevalence of anxiety and uncertainty related to food security, it is applicable to note that nearly every individual who responded to the HFIAS questionnaire felt as though their food-security-related anxiety had decreased since the arrival of the road. Although my research is not longitudinal in nature, and therefore cannot measure change (in this case, change in perception of anxiety or uncertainty since before the road), ethnographic narratives do indicate that food-security-related anxiety and uncertainty have decreased since the arrival of the road because villagers now have easier access to an alternate food source. The following quotes from villagers illustrate this sentiment:

“… no worry or anxiety these days, because we get everything from Taklakot.”
- 32-year-old female (Gyepo)

“... our fields produce only for one month! But because of Taklakot we don’t have any worry.”
- 42-year-old male (Kale)

The overall optimistic sentiment regarding the decrease in food-security-related anxiety and uncertainty is a good indication that the road is having a positive impact. It is important, however, to assess the extent to which villagers are still expressing anxiety and uncertainty regarding their food security, as well as whether there is variability in anxiety levels among and within the villages. In the following figure (Figure 6.10), I present this data:
Figure 6.10: Prevalence of anxiety and uncertainty. Contrary to popular belief, villagers in both villages expressed much more anxiety and uncertainty regarding their food security in the fall (harvest season) than in the spring (drought season).

Data clearly illustrate that villagers express more anxiety and uncertainty regarding their food security in the harvest season than they do in the drought season. Given the fact that villagers harvest their crops in the fall, these findings are contrary to the popular belief that anxiety-ridden feelings regarding food security should be higher during the drought season. Interview data show that this worry stems primarily from villagers having to work hard in the fields during the harvest season while simultaneously taking time away from home to travel to China to acquire enough storable goods to last through the barren winter months.

In numerous conversations with villagers living near the road, I found they seem especially anxious because they now feel pressure to capitalize on the road as much as they can; if someone mentioned that they had not been to the Chinese market yet because of their agricultural duties at home, they expressed to me a high level of worry and stress that they were missing out on opportunities. With the road, or “opportunity” as some call it, right in front of them, many individuals feel constant pressure to do a little bit more—to take one more trip to the market, to purchase just a little more food. Ethnographic narratives illustrate that this is a common feeling among those living near the road. According to a 28-year-old man in Geypo, “In month eight of the Tibetan calendar (around October), I am most anxious because I have to stock up on all of the food for the winter. But that is why I am going to Taklakot (the market town in China) today!” It is also relevant to note that during the fall, villagers do not have full “access” to
the food in terms of it being ready for consumption. During these months they are simply procuring all of the food–from both their agricultural yields and from the market–for it to be “accessible” during the winter/spring months.

The process of converting agricultural yields to a consumable form involves numerous steps: first, crops must be harvested (according to villagers it takes roughly two to three days to harvest each field; villagers have anywhere from 3 to 90 fields); second, villagers have to haul all of the crops back to their rooftops, which takes numerous hours. Then the crops have to be dried, beaten, and cleaned (to ensure that rocks and other unwanted particles get sifted out). The following photograph (Figure 6.11) portrays a typical scene in the villages during the harvest season, where the roof of each household is used to dry crops.

![Figure 6.11: Crops drying on the rooftop](image)

Lastly, the grain has to be turned into flour, which involves household members having to queue up to use the mill (both of my field site villages have only one small mill which is powered by water). In both villages, one family owns the mill and gets payment from each of the
households who use it (in the form of either cash or milled flour). The following photograph (Figure 6.12) is of a woman turning barley grain into flour at the local mill.

Figure 6.12: The final step–turning grain into flour

As many of these post-harvest agricultural tasks take time, and often need favorable weather, it is easy to understand why villagers are more anxiety ridden in the harvest season as opposed to the spring season, as they have many duties to complete in a relatively short amount of time.

Although villagers in Kale also expressed food-related anxiety and uncertainty, conversations indicated that, because they live much farther from the road, trips to the Chinese market or the temporary village are much less anxiety-producing than they are in Gyepo. The reason for this is that from Kale, trips to the Chinese market take much more planning. Oftentimes, households will team up and send one member from each household to travel to the market together. Because these trips are carefully timed and planned, they seem to manifest in a much calmer environment–villagers know when and for how long family members will be
travelling, and this limits anxiety and uncertainty. Of course, villagers expressed concern, but it was mainly regarding whether road conditions would remain favorable enough for villagers to be able to travel from their village to the road.

Because the HFIAS questionnaire measures food access, it is important to entertain the concept of “absolute access” vs “relative access,” and to be aware that nuances behind this distinction may be impacting the results of this questionnaire. Even though villagers living on the road might in fact be more food secure than they were previous to the road’s arrival, most of them perceive their access as being less, relative to the few people in their village who have managed to successfully capitalize on the road.

The second domain that the HFIAS questionnaire results are grouped in is “insufficient quality.” Data pertaining to this second domain include whether villagers feel as though they have access to a sufficient amount of high-quality food (again, I discuss quality-of-food related food security further in Chapter Seven), though these results provide an indication of whether villagers perceive they have access to quality food.

6.4.5 Food Security: Insufficient Quality

The following data points (Figure 6.13) illustrate which percentage of households in both villages experience insufficient food quality during both the fall and spring seasons.
Issues of insufficient food quality impact more people who live in Gyepo, and it is said to be more of an issue during the fall season. Household members cited the following reasons why they were not able to consume quality food during the fall season:

- **61 percent could not eat the types of foods that are preferred because of lack of resources**
  Of the respondents, 58 percent cited “lack of time” as the resource they did not have.

- **48 percent had to eat a limited variety of foods because of lack of resources**
  Of the respondents, 40 percent cited “lack of time” as the resource they did not have.

After cross-tabulating the data, I discovered that “time” was the resource that most households were lacking. Villagers indicated that on days when they are busy with the harvest and/or are engaged with opportunities afforded to them by the road, they do not have time to plan meals that they deem “higher quality” meals. Many individuals stated that life is so busy in the fall near the road that they often eat the same foods day after day because it is more convenient. According to interviews, the easiest food to prepare is faando, a Tibetan soup made with a water base (if available villagers will add dhee (female yak) fat to the soup to thicken it). Vegetables and flour pieces are added to the soup depending on availability; villagers stated that it is easy to
cook this soup for a lot of people, and, therefore, it is often eaten during the harvest season when family members are busy, tired, and do not have a lot of free time.

Notably, although issues such as busyness, tiredness, and lack of time are causing villagers to frequently eat less calories than they might need (particularly in the fall season), it is uncommon that villagers have to decrease their food intake due to a lack of available food. If villagers in Gyepo and Kale were experiencing extreme shortages of food, their reported HFIAS scores would be much higher than the data illustrate.

Another issue surrounding the quality of food that came up was the consumption of meat. Most individuals, when asked what their favorite food was, stated that it was meat. Villagers in both of these communities are Buddhist, however, and therefore do not kill animals, even if their food security depends on it. According to a 42-year-old man in Kale, “There is a religious boundary in killing animals. My favorite food is meat, so that is the problem.” Villagers do eat meat, however, when an animal has died of natural causes. Typically, when an animal belonging to one family dies, other households are either given some meat (in the cases where strong social ties exist) or have the option of trading for the meat or outright purchasing some of it from the family (a circumstance like this is another way that households have been known to earn income).

It is important to note that “quality” is based on individual preference. While most people prefer meat, some elderly people said that meat was difficult for them to chew, and, therefore, what they consider “quality food” is tingmo, puffed Tibetan bread that is steamed with the help of baking powder. Many elderly who have problems with their teeth prefer this food, and if it is not available, indicate that the “quality” of their diet is not high. Although the qualitative data suggest some level of variability in what foods people consider “high quality,” the fact remains that the highest percentage of households living in the road village during the fall had experienced insufficient food quality based on the HFIAS questionnaire.

60 There was one case in Gyepo where the daughter of a poor family needed surgery. Luckily for them, one of their animals died of natural causes—with the money they received from other households in exchange for some meat, the family was able to bring their daughter to a hospital in Taklakot, China for the surgery. This event highlights that having animals is a valuable asset that, under some circumstances, can also be used as insurance.
6.4.6 Insufficient Food Intake and Physical Conditions

The third and final access-related domain is “insufficient food intake and physical conditions.” The conditions within this domain are considered the “most severe,” as positive responses indicate that households are not able to maintain a minimum caloric intake. The ability to consume a sufficient amount of calories per day is the foremost concern when assessing food security; quality of food and nutritional issues are secondary. The following data points (Figure 6.14) illustrate which percentage of households in both villages experience insufficient food intake and physical conditions during both the fall and spring seasons.

![Figure 6.14: Prevalence of insufficient food intake and physical conditions](image)

Figure 6.14: Prevalence of insufficient food intake and physical conditions: It is interesting to note the large difference between the prevalence of insufficient food intake and physical conditions in Gyepo between the seasons. While 77 percent of households faced these issues in the fall, only 31 percent (which was less than in both seasons in Kale) experienced this in the spring.

According to ethnographic narratives, the primary explanations behind why villagers did not have a sufficient quantity of food to eat were related to improper meal planning, livelihood constraints, and the general feeling of being too busy.

Oftentimes villagers would say something similar to what one 26-year-old woman in Kale said, “This (insufficient food intake) is the case only when I cook for the family and then someone comes to visit unannounced, and I then have to feed them as well, and then I don’t have enough food.” According to another 33-year-old woman in Kale says, “Sometimes there isn’t enough food for me, after all my family eats, and then I am just too lazy to make more food.”
These narratives illustrate two points:

1.) That Buddhist culture holds guests in a very high regard, and, therefore, a family would never turn a guest away, even if it means that there will not be as many resources (in this case, food) left for them.

2.) Because women are the last ones to eat in the household, they are often times the ones who are left hungry at the end of the meal. In the case of the woman I quoted above, it was her unwillingness to cook a second time that led her to go to bed hungry, not necessarily the fact that there was not enough food to eat in the household.

It becomes important to mention that nearly all of the food that these villagers eat needs to be prepared (i.e. the flour needs to be made into bread); the option of just “quickly grabbing something” (i.e. a packaged food item) has for decades been nearly nonexistent, though this is changing with the easier accessibility to packaged foods via the new road (I will discuss this more in the next chapter).

The second explanation behind why villagers had an insufficient quantity of food to eat relates to livelihood constraints. When villagers are engaged in tasks outside of the home—taking the cattle to graze in far away pastures, harvesting medicinal herbs, and/or collecting fodder and/or firewood, they are more likely to miss a meal. As one villager stated, “It makes it hard to eat properly.” Most villagers indicated that month eight of the Tibetan Calendar (around October) is when villagers are most busy, and, therefore, the quantity of meals gets sacrificed. There was only one respondent who indicated that he has gone an entire day and night without eating in the last thirty days; the 22-year-old male said, “When I go out with the animals to get cordakay, it happens. We also use our cattle as transportation, and when I go out with them, it also happens. In the last thirty days, twice it happened that I went an entire day and night without eating.” Again, I must note that these circumstances of having to go long periods of time without eating are unusual, and, therefore, should be considered outliers, though it is helpful to be aware of these unique circumstances. Typically, when male villagers go to collect cordakay, they do bring adequate amounts of food with them.

Most responses to the HFIAS questionnaire included comments such as, “When I go to the mountain to collect herbs, I eat less meals per day,” and “I eat fewer meals in a day when I am harvesting or at the grazing place.” Although families do pack snacks for family members
who are participating in these livelihood tasks, most indicate that the food they can easily transport and carry with them never constitutes a full meal.

Many villagers also mentioned that because their village only has one crop season, issues of insufficient food quantity are of concern. However, according to most, these problems are not nearly as bad as they once were, prior to the arrival of the road and the easier market access. When asked the question, “Was there ever no food to eat of any kind in your household?” villagers responded by saying, “For the sake of Taklakot, no,” and “Before some years, we had this situation, but not anymore, no.”

Ethnographic narratives indicate that in general, the problem of insufficient food quantity is much less of an issue now than it once was. Most families experience more problems in the fall due to lack of time, the fact that they are often too busy to cook or eat, and/or because they are far from home due to livelihood tasks. Notably, however, other villagers responded in the opposite manner by saying statements like, “Life is hard in our village [in Kale]. We run after herbs and work hard. But we always have food. Work pays off in terms of food.”

The final indicator that can be obtained via the HFIAS questionnaire is the Household Food Insecurity Access Conditions. This indicator provides specific, disaggregated information about behaviors and perceptions of the surveyed households (Coates et. al 2007).

6.4.7 Household Food Insecurity Access (HFIA) Conditions

This indicator illustrates the percent of households who responded affirmatively to each question on the questionnaire. Results from this indicator are useful when trying to answer a specific question relating to food security. For example, if an assistance program or NGO in Upper Humla were working toward improving the storage capacity of staple crops throughout the winter months, it would be beneficial to understand what percentage of households had run out of food. The following table (Table 6.8) illustrates what percentage of households responded “yes” to each of the household food insecurity access conditions:
Table 6.8: Percentage of HHs experiencing each HFIA condition

<table>
<thead>
<tr>
<th>Household Food Insecurity Access Conditions</th>
<th>Fall, 2014</th>
<th>Spring, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worry about not having enough food</td>
<td>Gyepo</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>45</td>
</tr>
<tr>
<td>Could not eat preferred foods</td>
<td>Gyepo</td>
<td>61&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>34</td>
</tr>
<tr>
<td>Eating a limited variety of food</td>
<td>Gyepo</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>28</td>
</tr>
<tr>
<td>Eating undesired foods</td>
<td>Gyepo</td>
<td>52&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>31</td>
</tr>
<tr>
<td>Had to eat smaller meals</td>
<td>Gyepo</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>7</td>
</tr>
<tr>
<td>Had to eat fewer meals in a day</td>
<td>Gyepo</td>
<td>68&lt;sup&gt;D&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>45&lt;sup&gt;D&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ran out of food often</td>
<td>Gyepo</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>0</td>
</tr>
<tr>
<td>Individuals went to sleep hungry</td>
<td>Gyepo</td>
<td>29&lt;sup&gt;D&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>10</td>
</tr>
<tr>
<td>Individuals did not eat all day/night</td>
<td>Gyepo</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>0</td>
</tr>
</tbody>
</table>

The letters in the highlighted sections correspond to the explanations below.

The results highlighted in Table 6.11 are worth discussing further. The data in the cells marked “A” illustrate that in the spring, in both villages, only 24 percent of households are worried about not having enough food. This further confirms a point made earlier in the chapter that it is in fact during the winter/spring months that most households have access to enough food because they can now utilize the food that they spent the fall months either harvesting (this includes the task of turning grain into edible flour) or purchasing from China and/or the temporary market. Although most anxiety exists in Gyepo in the fall, it is important to note that food-security-related anxiety is heavily determined by seasonal fluctuations.

The data in the cells marked “B” highlight that a high percentage of households in Gyepo said they were not able to eat preferred foods and/or had to eat undesired foods during the fall. When assessing the implications of this data, it is important to assess what types of foods villagers living near the road deem “preferred” or “desirable.” Villagers in Gyepo classify the new, “modern” foods (which are often times less healthy) as desirable, and, therefore, without consistent access to these foods would respond “yes” to either question two or four. That indicates that these data points cannot solely be attributed to high food insecurity. In contrast, a very low percentage of households in Kale report having to eat “undesirable foods” throughout the year. Could it be that the villagers in Kale are simply happy with their local cuisine while the villagers in Gyepo are including more new “modern” foods in their definition of “desirable?”

The data in the section marked “C” indicate that households in both villages eat a much higher variety of food in the spring when compared to the fall. Not only is this positive in terms of villagers eating more of the foods they like and enjoy, but a high dietary diversity typically
indicates that the diet in general is more nutrient dense (Dickerson et al. 2008) and, therefore, is more healthy (I further discuss the nutritional implications of these dietary diversity fluctuations in Chapter Seven).

The data in the section marked “D” are telling as they indicate that many households in Gyepo are experiencing quantity-of-food-related food security issues. In the fall and spring seasons many households (68 percent and 45 percent, respectively) had to eat fewer meals in a day.

In the following and final section of this chapter, I examine whether other demographic, sociocultural, and/or economic variable(s) could help to explain some of the food security variability that exists within my two field site villages.

6.5 Intra-Village Variability in Food Security Levels

Using a variety of statistical tests in SPSS, I test whether the following variables have a statistically significant relationship to food security. If one such relationship exists, it could yield another determinant of food security in addition to “proximity to road” and “seasonality,” which I have already established as being statistically significant determinants. The following is a list of independent variables I tested as potential determinants of food security:

- Land Abandonment
- Human Capital
- Socioeconomic Status
- Female Head of Household
- Presence of Family Business
- Presence of Successful Greenhouse
The one-way ANOVA test indicated that socioeconomic status ("poor," "average," and "wealthy," as measured using cultural domain analysis, see Chapter Four) does have a statistically significant relationship to food security (as measured by the HFIAS Score), $F(2,113) = 5.50, p = .005$. The results from the ANOVA test suggest that the samples were not drawn from populations with the same means. I conclude that there are significant differences between food security and SES categories in general. To test which SES groups differed, I executed a Tukey Post Hoc test (the results of which are illustrated in Table 6.10)

61 Earlier in this chapter, I discussed how villagers are sharing their greenhouse yields with others in the village who do not have a functioning greenhouse. Even though there is no statistically significant relationship between food security and the "presence of a greenhouse," data suggest that greenhouses are increasing the overall food security, dietary diversity, and nutrient density of villagers’ diets. For future research, it would be interesting to compare the food security of a village with greenhouses to that of a village without greenhouse access.
Table 6.10: Post hoc test: Tukey HSD

SES Categories: 1 = poor, 2 = average, 3 = wealthy

<table>
<thead>
<tr>
<th>(I) SES</th>
<th>(J) SES</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95 percent Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2.731*</td>
<td>.837</td>
<td>.004</td>
<td>.74</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>2.659</td>
<td>1.221</td>
<td>.079</td>
<td>-.24</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>-2.731*</td>
<td>.837</td>
<td>.004</td>
<td>-4.72</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>-.071</td>
<td>1.072</td>
<td>.998</td>
<td>-2.62</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>-2.659</td>
<td>1.221</td>
<td>.079</td>
<td>-5.56</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>.071</td>
<td>1.072</td>
<td>.998</td>
<td>-2.47</td>
</tr>
</tbody>
</table>

The Tukey post-hoc test indicates that there are only significant differences between the “average” and “poor” SES groups (p=.004) in terms of their food security. There are no statistically significant differences between the “poor” and “wealthy” SES groups or the “average” and “wealthy” SES groups in food security levels. By looking at this data graphically, however, it is easy to see that a direct relationship exists between food security and SES; poorer households have lower food security, while wealthier households have higher food security (see Table 6.13).

Figure 6.15: Average food security by village and SES category: The data illustrate that food security (as represented by the average HFIAS Score) increases in both villages as household socioeconomic status increases. This signifies that there is a direct relationship between food security and socioeconomic status.
The aforementioned data results illustrate that in terms of food security, “average” and “wealthy” households away from the road fare better than households of any SES category in Gyepo. This data further confirm that better road access does not indicate higher food security levels. So why are most households away from the road (aside from the very poor) experiencing such high food security levels?

Ethnographic narratives indicate that in Kale, households simply view the easier Chinese market access afforded to them by the road as an “added benefit” or “convenience.” Unlike households in Gyepo, not a single household in Kale abandoned any of their land in search of road-related “opportunities,” and villagers’ values are not shifting as drastically as they are in Gyepo, where some households have sold off their cattle or allowed their land to go fallow to be able to invest in road-related opportunities (such as a truck or a restaurant). According to focus group data, households in Kale are, for the most part, carrying on as usual with life as it has been, pre-road. They still place heavy value on agricultural activities, and, aside from some village men engaging in an herb or timber business, nearly all of the household resources are dedicated to agropastoralism.

According to villagers in Kale, the increased market access helps them to increase the variety of their diets and to “have more of a safety net.” As previously mentioned, although some villagers from Kale will travel in groups to the Chinese market a few times per year to purchase some additional items, they do not seem to be as reliant on these trips to China as the households who live in Gyepo. Villagers in Kale explained to me that due to the remoteness of their village, unpredictable weather patterns, and the difficult terrain they need to cross to reach the market in China, it would not be wise to rely on it for their food security. According to one 26-year-old man who is often engaged in business outside of Kale, “If the snow comes, it is too difficult…then we cannot reach the road easily”.

Because these households are far away from the road, they are not presented with or tempted by road-related “opportunities” nearly as frequently as the villagers living in Gyepo. While this is not allowing villagers to capitalize on the road in terms of business and/or economic advancement, it also is not tempting households to take many risks. The fact that fewer risks are being taken (an example of a risk would be selling cattle to invest in a restaurant) results in a relatively equal (in terms of wealth) village, one that is still engaging in agricultural practices as normal with the added benefit of a road and easier market access.
6.6 Conclusion

The data I present in this chapter highlight that the arrival of the first road in Humla District is only one of the numerous sociocultural, economic, and demographic variables that play a role in determining villagers’ access to food and their food security levels. In general, when people ask me whether the new road has increased villagers’ food security, I respond by saying “yes,” on an aggregate level, especially in terms of their quantity-of-food-related food security, it most certainly has. Although my study was not longitudinal, nearly all of the villagers who I spoke with assured me that their food-related anxiety, dietary diversity, and overall levels of acquired food have increased since the arrival of the road. This alone is affirmation that the road is providing villagers in both Gyepo and Kale with easier access, something that is, in general, making it easier to maintain adequate food security levels.

Data from this chapter also illustrate, however, that food security levels are extremely variable both between villages, between seasons, and within villages. Results from the HFIAS questionnaire indicate that, on average, villagers in Gyepo experience higher levels of food insecurity than villagers in Kale. This is due to a variety of factors, most notably that agriculture has remained the primary livelihood in Kale and is more reliable than road-related nonagricultural wage labor.

In addition to “proximity to road” playing an important role in determining villagers’ food security levels, both “seasonality” and “socioeconomic status” proved to also have statistically significant relationships with this health domain. The numerous other variables I tested however, (i.e. human capital, presence of a greenhouse, etc.) did not show a statistically significant relationship with food security.

Data presented in this chapter illustrate that villagers, particularly those living on the road, tend to have a more difficult time maintaining food security levels during the harvest season, due to high road-induced stress and anxiety levels, changing indicators of value, and a

[62] Interview data illustrate that greenhouse yields are very much shared among the community, and this could be why the variable “presence of a greenhouse” does not have a statistically significant relationship with food security levels. Those families with successful greenhouses oftentimes will share their yields with other families whose greenhouses are not doing as well. Based on observation and interview data, I do believe that greenhouses are having a very positive impact on villagers’ food security levels, but I could not test for this impact by simply comparing the food security level of a household with a greenhouse with one that does not have one, due to the amount of sharing that occurs within the villages.
lack of the valuable resource “time.” These road-stressors are proving to have such a negative impact that both “average” and “wealthy” households in Kale are actually better off in terms of their food security levels than a household of any wealth category in Gyepo.

The dominant development narrative suggests that food security levels should increase with the introduction of a road and be higher in the harvest season as opposed to the drought season. The findings I presented in this chapter negate these two aspects of the development narrative by providing a case study where the dominant discourse does not apply.

To conclude this chapter, I provide a list of my primary findings as it relates to food security, the first of three “health domains” I am concerned with for my research.

• The relationship between food security and “proximity to road” is statistically significant; this leads me to reject my original null hypothesis and determine that “proximity to road” is a strong determinant of household food security. However, the significant relationship between “proximity to road” and food security levels is opposite to what I originally expected—villagers in Kale have higher food security levels than those living in Gyepo.

• “Seasonality” and “socioeconomic status” are also strong determinants of food security.

• There is no statistically significant relationship between food security and the following indicators: land abandonment, female head-of-household, ownership of a business, amount of human capital, or having a successful greenhouse.

• Although ethnographic accounts and data illustrate that there is some sort of relationship between a household having a successful greenhouse and their food security level, due to limited data on sharing networks, I am not able to prove that this relationship exists.

• Food insecurity is of most concern for households in Gyepo in the fall.

• In the fall, the highest percentage of households in both villages are “moderately food insecure,” while in the spring, the highest percentage of households in both villages are “food secure.”

• Issues of insufficient food quality impacts villagers in Gyepo during the fall, mainly because they do not have enough time to dedicate to proper meal planning and/or execution.

• Food security is of least concern for households in Kale that are of “average” or “wealthy” SES.

• Ethnographic narratives indicate that both insufficient food quantity and food-security-related anxiety and uncertainty levels have dropped since the arrival of the road.
Chapter 7
Beyond Proximity to Road: How Gender, Cash Crops, and Traditional Habits Impact the Local Diet and Provide a Framework for Dietary Recommendations

7.1 Introduction

In Chapter Six, I discussed villagers’ food security levels in terms of their access to food. Although differences between food security levels exist at both a village and household level, villagers indicated that overall, the new road in Humla District has provided them with access to a new food source, which has greatly increased the amount of food they now have available to them. These data also illustrate that although some households had issues with food-related anxiety, lack of time to “eat properly,” and/or inadequate dietary diversity during the harvest season, most villagers did not report experiencing a severe lack of food at any time throughout the year.

Of secondary concern to villagers acquiring enough calories, however, is whether the foods being consumed are nutrient-dense. If most villagers are consuming a large amount of processed foods and/or foods with a high sugar content, this could be evidence that villagers are progressing along the nutrition transition to Pattern Four: Degenerative Disease (see Chapter Three for more details). In addition to assessing the types of foods currently in the diet of Gyepo and Kale villagers, I also assess whether dietary patterns are resulting in an inadequate intake of certain macro- and micro-nutrients. My food frequency questionnaire (FFQ) data allow me to examine food security one step further, by measuring villagers’ quality-of-food-related food security, in addition to their quantity-of-food-related food security.

In this chapter, I investigate nutritional status by assessing the overall dietary intake patterns of villagers in both field site villages. I identify what types of food villagers are acquiring from the market in China, and how these foods compare nutritionally to locally grown foods. This dietary assessment allows me to pinpoint nutritional gaps in diets, as well as determine which subsets of the population are in need of greatest nutritional assistance.
Because villagers who live in closer proximity to the road (in Gyepo) have easier access to the enriched, processed foods available at the Chinese market, I hypothesized that their overall nutritional status would be lower (indicated by a higher percentage of individuals falling outside the “normal” weight category) than the nutritional status of villagers living away from the road (in Kale).  

H1 = The nutritional status (as measured by anthropometry) of villagers who live in close proximity to the road (in the case village) will be lower than that of villagers in the non-road village (in the control village), because they live in closer proximity to the new road and have better access to the enriched, processed foods found at the Chinese market.

Ho = There is no difference in the nutritional status of villagers by proximity to the road.

To provide context within which to test my hypothesis, I first provide an example of a typical dietary assessment from one individual. By continually referring back to this example, I summarize the foods that are habitually being consumed in my two field site villages, as well as provide an explanation of where these foods are typically sourced. I then discuss the nutritional impacts of the local Humli diet and compare consumption patterns between villages, seasons, and gender. Following the in-depth dietary assessment, I present anthropometric data that provides information on nutritional status. Based on both the dietary analysis and the anthropometric data, I provide dietary recommendations for each village to increase the nutrient density of diets and improve the overall health of villagers.

7.2 Dietary Assessment of Villagers

To assess the nutritional composition of villagers’ diets, I conducted a Food Frequency Questionnaire (FFQ) twice with each household (see Appendix A4.1 for questionnaire), once in...
the fall and once in the spring. Using The Food Processor software (see Chapter Four for details), I first calculated the overall nutrition composition of each villager’s diet. I then assessed the amount of macro- and micro-nutrients, vitamins, and minerals that individuals, on average, consume. As discussed in Chapter Four, the purpose of implementing an FFQ was not to evaluate individual dietary patterns but to better understand dietary trends on a population, or village, level. Before assessing the nutrient content of villagers’ diets, however, I will begin by providing information on the average caloric consumption of villagers by proximity to road, season, and gender. Not only does this caloric information provide a framework for the forthcoming nutrient analysis, but it is a necessary next step to the Chapter Six analysis, in which I assess villagers’ access to food in a more qualitative sense.

7.2.1 Calories Consumed and Expended

On average, villagers consume anywhere between 1,034 to 7,466 calories (kcals) per day. Although this average daily caloric consumption data may seem high, it must be viewed in conjunction with average daily caloric expenditure. Villagers in Upper Humla work extremely arduous, long days; according to interview data, they work an average of 13 hours per day. This work includes everything from housework, cooking, cleaning, agricultural tasks, gathering firewood (which often includes chopping wood), tending to animals, carrying heavy loads, doing laundry by hand and taking care of children. Often times, villagers are doing multiple tasks simultaneously (such as tending to children while carrying a heavy load of firewood on their backs), which requires expending an even greater number of calories. Additionally, villagers must walk great distances to complete some of these tasks.

Once all of these tasks are factored in, it becomes evident that the amount of calories villagers expend on any given day is very high. The following table (Table 7.1) gives an example of the average caloric expenditure for a 115-pound woman. The activities and timescale listed in interviews with men because they were the ones in charge of cooking, or because the woman was not in the village at that time for one reason or another (i.e. she was visiting her natal village).

65 After I conducted each of the FFQs, I asked villagers to tell me about their average workday—not only the types of activities they performed, but the number of hours they spent performing each activity. This information allowed me to acquire a general sense of the amount of calories villagers are expending each day. Although this data is not 100 percent precise, it does provide a general sense of villagers’ caloric expenditures.
this table are based on numerous interviews I conducted regarding the type of work men and women do on an average day, as well as the time they spend occupied with each activity.

Table 7.1: Example of daily calories expended [115 lb. woman]

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
<th>Calories (Kcal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yard work (heavy)</td>
<td>6</td>
<td>2346</td>
</tr>
<tr>
<td>Walking (3miles/hour)</td>
<td>2</td>
<td>460</td>
</tr>
<tr>
<td>Housework</td>
<td>3</td>
<td>587</td>
</tr>
<tr>
<td>Heavy Lifting</td>
<td>2</td>
<td>540</td>
</tr>
<tr>
<td><strong>Total Calories Expended</strong></td>
<td></td>
<td><strong>3933</strong></td>
</tr>
</tbody>
</table>

Given that the standard daily caloric expenditure of a 115-pound woman in Upper Humla is 3933 (kcal), it becomes more realistic to think that, on average, villagers are consuming anywhere between 1,034 to 7,466 calories per day. My dietary analysis data illustrate, however, that caloric consumption certainly varies by village, season, and gender. The following table (Table 7.2) illustrates these figures.

Table 7.2: Average daily calorie consumption by village, season & gender

<table>
<thead>
<tr>
<th>Calories (Kcal)</th>
<th>Kale Fall</th>
<th>Kale Spring</th>
<th>Gyepo Fall</th>
<th>Gyepo Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
<td>3682</td>
<td>2941</td>
<td>3997</td>
<td>2682</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>3766</td>
<td>4057</td>
<td>5270</td>
<td>4078</td>
</tr>
<tr>
<td><strong>Total Population</strong></td>
<td>3713</td>
<td>3240</td>
<td>4013</td>
<td>2931</td>
</tr>
</tbody>
</table>

From the data in Table 7.2, a few major trends appear: 1.) In both villages, more calories are consumed in the fall than in the spring, 2.) In the fall, more calories are consumed in Gyepo, while in the spring, more calories are consumed in Kale, and 3.) Men consume more calories than women in both villages and in both seasons.

When looking at total levels across villages, more calories are being consumed in the fall than in the spring. The data are interesting given that villagers’ food security levels (as indicated in Chapter Six) were lower in the fall than in the spring. However, data show that since the fall (harvest season) requires individuals to be more active, they also need more calories during that time of year. This suggests that even though villagers are in fact eating more in the fall, their net caloric gain may in fact be less than it is in the spring. Whether villagers are consuming enough calories, given the amount they expend, will be further addressed later in this chapter via the
anthropometric data analysis, which provides more insight into the presence of villagers’ malnutrition levels.

Notably, villagers in Gyepo consume more in the fall, while villagers in Kale consume more in the spring. Even though villagers in Gyepo illustrated high food insecurity levels in the fall (see Chapter Five), they are, on average, consuming a high amount of calories. It should be noted, however, that there is a great disparity between the daily caloric consumption levels of villagers in Gyepo; while some villagers consume as much as 7,466 calories per day, others are surviving on as little as 1,197 calories per day (range = 6,269 kcals). This indicates that even though the average daily calories in the road village in the fall are high, the number could be inflated because some villagers are consuming a very high amount.

In comparison, in the fall in Kale the range of average daily calories consumed is much lower (range = 4,473 kcals), illustrating that even when assessing daily caloric levels, Kale shows more equality. In Kale, more calories are being consumed in the spring; the data reflect the general narrative of Chapter Six, which explained how villagers typically work hard to store food in the fall that they can then leisurely consume in the spring.

The difference in what men and women consume per day is quite substantial in both seasons in Gyepo and in the spring in Kale. This difference is most notable in Gyepo in the spring when men are consuming 1396 more calories per day, on average, than women. The reason for this gender divide can partially be explained by the fact that in Buddhist households, although women are responsible for cooking the food, men always eat first (and often continue to eat, helping themselves to a second portion). Although women often taste the food while they are cooking, these added calories do not seem to be significant as indicated by the gender gap in calories consumed. As I discussed in Chapter Six, sometimes women will cook enough food for their family and themselves, and then an unexpected guest will arrive (this happened very frequently while I was living in the villages). Women are obligated (and honored) to feed their guests, though this custom oftentimes does result in women consuming fewer calories than they might often need. The following picture shows a woman making bread (roti) out of a mixture of market-purchased white flour and locally grown wheat flour. Villagers often times mix these flours together, saying, “It just tastes better that way…We know we don’t have enough flour.

66 Across many indicators (for example, caloric consumption, socio-economic status, and well-being), Kale shows much more equality, whereas Gyepo shows much higher inequality levels.
from just our fields, but we mix what we buy (in China) with the food we grow ourselves, and then the taste is good.”

Figure 7.1: Making bread (roti) over the wood-burning stove

Having access to the recommended daily caloric levels is highly important for villagers’ quantity-of-food-related food security. However, when assessing villagers’ diet for nutritional value, it is more important to investigate the source and nutrient-density of the calories being consumed.

7.2.2 Sources of Calories

Although my dietary analysis is on a population level, the following table (Table 7.3) provides an example of what a typical daily diet looks like for an active 63-year-old female
named Lhamo,\textsuperscript{67} who lives in Kale. Although the list of foods on this table is inclusive of Lhamo’s diet, the listed nutrients are just a sampling of the nutrients I include in my overall assessment of villagers’ diets.

Table 7.3: Individual dietary assessment [Lhamo: female, age 63, Kale, fall season]\textsuperscript{68}

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Quantity</th>
<th>Measure</th>
<th>Wgt (g)</th>
<th>Cals (kcal)</th>
<th>Fat Cals (kcal)</th>
<th>Prot (g)</th>
<th>Carb (g)</th>
<th>Sugar (g)</th>
<th>Fat (g)</th>
<th>Alcohol (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>potato, cooked, in skin, peeled, diced</td>
<td>0.5 Cup</td>
<td>78</td>
<td>67.86</td>
<td>0.7</td>
<td>1.46</td>
<td>15.7</td>
<td>0.68</td>
<td>0.08</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>radishes, daikon, boiled, drained</td>
<td>1.3 Gram</td>
<td>3.3</td>
<td>0.56</td>
<td>0.07</td>
<td>0.02</td>
<td>0.11</td>
<td>0.06</td>
<td>0.01</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>mustard greens, boiled, drained</td>
<td>0.02 Gram</td>
<td>0.02</td>
<td>0.01</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>chili peppers, hot, red, fresh</td>
<td>2 Tsp.</td>
<td>9.33</td>
<td>82.51</td>
<td>82.51</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9.33</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>tea, black, brewed</td>
<td>5 Oz.</td>
<td>141.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>salt, table, non-iodized</td>
<td>0.1 Tsp.</td>
<td>0.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>soda, Coca-Cola</td>
<td>1 ml.</td>
<td>1.04</td>
<td>0.41</td>
<td>0</td>
<td>0</td>
<td>0.11</td>
<td>0.11</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>local alcohol (rakshi)</td>
<td>3 Cup</td>
<td>698.4</td>
<td>935.87</td>
<td>3.49</td>
<td>34.92</td>
<td>0</td>
<td>0</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hard candy</td>
<td>0.3 Each</td>
<td>1.8</td>
<td>7.09</td>
<td>0.03</td>
<td>0</td>
<td>1.76</td>
<td>1.13</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>soup (thenthuk)</td>
<td>1.6 Oz.</td>
<td>45.36</td>
<td>40.12</td>
<td>14.89</td>
<td>1.87</td>
<td>4.41</td>
<td>0</td>
<td>1.65</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>dumpling radish, w/mustard oil</td>
<td>0.8 Unit</td>
<td>9.39</td>
<td>25.59</td>
<td>7.41</td>
<td>0.67</td>
<td>4.08</td>
<td>0.11</td>
<td>0.84</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>dumpling, spinach w/canola oil</td>
<td>0.8 Unit</td>
<td>11.61</td>
<td>26.04</td>
<td>7.26</td>
<td>0.78</td>
<td>4.17</td>
<td>0.09</td>
<td>0.84</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>lentils, boiled</td>
<td>0.125 Cup</td>
<td>24.75</td>
<td>28.71</td>
<td>0.85</td>
<td>2.23</td>
<td>4.98</td>
<td>0.45</td>
<td>0.09</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>kidney beans, boiled</td>
<td>0.125 Cup</td>
<td>22.12</td>
<td>28.09</td>
<td>1</td>
<td>1.92</td>
<td>5.04</td>
<td>0.07</td>
<td>0.11</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>yak yogurt</td>
<td>16 Oz.</td>
<td>453.5</td>
<td>9</td>
<td>385</td>
<td>270</td>
<td>30</td>
<td>--</td>
<td>40</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>yak milk</td>
<td>3 Oz.</td>
<td>85.05</td>
<td>89.82</td>
<td>54.32</td>
<td>4.62</td>
<td>4.26</td>
<td>4.26</td>
<td>6.04</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>bread (roti) millet</td>
<td>0.3 Unit</td>
<td>25.51</td>
<td>62.14</td>
<td>3.3</td>
<td>1.73</td>
<td>12.73</td>
<td>0.02</td>
<td>0.37</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>barley flour, whole grain, stone ground</td>
<td>0.5 Cup</td>
<td>60</td>
<td>220</td>
<td>0</td>
<td>6</td>
<td>46</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>fry bread (polla) w/mustard oil*</td>
<td>36 Gm.</td>
<td>36</td>
<td>93.29</td>
<td>19.82</td>
<td>2.79</td>
<td>16.63</td>
<td>0.34</td>
<td>2.23</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>bread (roti), white flour</td>
<td>89.39 Gm.</td>
<td>89.39</td>
<td>170.61</td>
<td>4.13</td>
<td>4.84</td>
<td>35.77</td>
<td>0.13</td>
<td>0.46</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>buckwheat pancake (kova), 2 Cups</td>
<td>1 Unit</td>
<td>200.4</td>
<td>87.12</td>
<td>10.23</td>
<td>3.79</td>
<td>15.15</td>
<td>0.76</td>
<td>1.14</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>soup (tupa) (barley/wheat), radish</td>
<td>1 Unit</td>
<td>200</td>
<td>133.78</td>
<td>20.42</td>
<td>4.57</td>
<td>25.83</td>
<td>1.02</td>
<td>2.27</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{67} This name has been changed for confidentiality purposes.

\textsuperscript{68} As I explained in Chapter Four, to conduct the FFQ, I ask the respondent to list the foods (including frequency and amount) that he/she has eaten in the past ninety days. I then calculate the daily totals (for example, if something was consumed once per month I divide this quantity by 30). This method better captures the dietary diversity than the 24-dietary recall method. However, one cannot assume that all of these foods were in fact consumed each day; this method simply gives a more accurate picture of all of the foods that villagers are eating during a specific time of the year.
I chose to include Lhamo’s dietary profile because she consumes a mix of locally produced, traded for, and market-purchased foods (many other villagers do not consume such a high variety of foods that are either traded for or market purchased). Lhamo comes from a family of high socioeconomic status in Kale; one of her sons has a lucrative herb business, which means he frequently travels to other villages where he can trade for food (Lhamo’s son typically trades local bitter buckwheat), in addition to making frequent trips to China to sell the herbs (where he can easily purchase foods with the income he earns from selling the herbs).

Some foods available in my field site villages were not consumed by Lhamo, and, therefore, are not included in the above dietary assessment example. (The foods most notably missing are: white rice (available in China), cilantro and garlic (which can grow in the greenhouses), nettles (found in the villages), eggs (available in China but very rarely eaten in the non-road village), and Chinese beer and alcohol (available in China.) In the following table (Table 7.4) I parse out the foods Lhamo eats by source during the fall season:

### Table 7.4: Sources of consumed foods [Lhamo, Kale, fall season]

<table>
<thead>
<tr>
<th>Locally Produced</th>
<th>Traded For</th>
<th>Market Purchased (China)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat Flour</td>
<td>Chili Peppers</td>
<td>White Flour (refined)</td>
</tr>
<tr>
<td>Barley Flour</td>
<td>Millet</td>
<td>Wheat Flour (refined)</td>
</tr>
<tr>
<td>Buckwheat Flour</td>
<td>Lentils</td>
<td>Oil, Canola (refined)</td>
</tr>
<tr>
<td>Potato</td>
<td>Kidney Beans</td>
<td>Coca-Cola</td>
</tr>
<tr>
<td>Daikon Radish</td>
<td>Red Rice</td>
<td>Black Tea</td>
</tr>
<tr>
<td>Greens, Spinach*</td>
<td></td>
<td>Salt, Iodized</td>
</tr>
<tr>
<td>Yak Milk</td>
<td></td>
<td>Salt, Tibetan</td>
</tr>
<tr>
<td>Yak Yogurt</td>
<td></td>
<td>Hard Candy</td>
</tr>
<tr>
<td>Yak Butter</td>
<td></td>
<td>Spices (masala, turmeric)</td>
</tr>
<tr>
<td>Oil, Mustard</td>
<td></td>
<td>Powdered Milk</td>
</tr>
</tbody>
</table>

*The spinach Lhamo ate in her dumplings came from the family’s greenhouse*
The locally produced foods contain three types of flour (wheat, barley, and bitter buckwheat). It is typical to eat these three types of flour as either bread (*roti*), rolled out into flat thick pieces in a noodle soup (*thenthuk*, where “*then*” means “pull” and “*thuk*” means “noodles” in Tibetan), or as a pancake (*kora* is the Tibetan word for a buckwheat pancake, which villagers eat with spicy sauce nearly every day around 3 p.m.). The following is a photograph of a villager in Gyepo preparing the typical midday *kora* snack:

![Figure 7.2: Preparing the midday buckwheat pancake](image)
Additionally, villagers use barley to make the local beer (*chang*) and local liquor (*rakshi*), which is similar to Japanese sake in nutritional composition. The two types of vegetables that grow locally in both Gyepo and Kale are potatoes and daikon radish. Villagers use these as the filling for dumplings (*momos*), cook them in a hot pan with oil, or cook them in a soup (*thenthuk*). Villagers also frequently eat boiled potatoes as a snack in the afternoon, which they dip in locally made chili sauce (*achar*). Interestingly, however, villagers always peel the potatoes and never eat the skin, which contains approximately 50 percent of the nutrients and minerals. Villagers also eat the mustard greens from their mustard crops as a sautéed vegetable or in soup.

From observation, I know that Lhamo’s greenhouse was not producing vegetables at optimum levels during the fall of 2014 because the family was having trouble getting adequate amounts of water to the structure. From Lhamo’s dietary profile (Table 7.3), it is apparent that she is only eating spinach from her greenhouse; Lhamo consumed spinach as a dumpling filling, but she also frequently sautéed it and ate it with bread or cooked it in soup.

If villagers consume dairy, they eat it in month eight or nine of the Tibetan calendar (Oct/Nov). This is when villagers bring their cattle back from the high alpine pastures. Because I conducted my first round of FFQs exactly at this time, it makes sense that Lhamo was able to consume both milk and yogurt during the three-month survey period. In both Gyepo and Kale, dairy is either eaten all of the time (when it is in season) or not at all. Villagers typically heat up the milk and drink one cup per day (although milk tea is a commonly enjoyed beverage in Nepal, it is not frequently consumed in Tibetan households); in Tibetan households, yak butter tea is the beverage of choice.

The ethnic-Tibetan population in Humla consumes a great quantity of yak butter tea. Not only is it a warm beverage that provides heat during the cold winter months, but it is also rich in fat and calories that are beneficial to individuals working long, hard days, oftentimes without receiving enough calories from food alone. Lhamo, for example, consumes an average of 20 six-ounce cups of yak butter tea per day (see Table 7.5):

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Quantity</th>
<th>Measure</th>
<th>Wgt (g)</th>
<th>Cals (kcal)</th>
<th>Fat Cals (kcal)</th>
<th>Prot (g)</th>
<th>Carb (g)</th>
<th>Sugar (g)</th>
<th>Fat (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>yak butter tea, 1 cup</td>
<td>20</td>
<td>Unit</td>
<td>4500</td>
<td>1301</td>
<td>1071</td>
<td>19</td>
<td>44</td>
<td>17.46</td>
<td>119</td>
</tr>
</tbody>
</table>
It is important to note that 31 percent of Lhamo’s total daily calories (she consumes an average of 4134 kcals/day) comes from yak butter tea. From observation, older individuals do drink more tea per day than younger individuals, as they are able to do most of their work from home and have more frequent access to it. Lhamo, for example, was very active around the house (during harvesting time she would sort and filter all of the seeds, cook all of the meals, clean the home, and watch the children), but she would drink yak butter tea simultaneously. Villagers who work in the fields however, although they do take a thermos of yak butter tea with them each day, do not consume, on average, as much as 20 cups per day. Notably, they use market-purchased powdered milk when making yak butter tea (one tablespoon for approximately twenty six-ounce cups). They also only use Tibetan salt in their butter tea. 69

Villagers from Gyepo and Kale typically trade locally for four foods: lentils, kidney beans, millet, and chili peppers (all of these foods were consumed by Lhamo and are shown in her dietary assessment, Table 7.3). Lentils and kidney beans are both excellent sources of protein and have numerous vitamins and minerals, including Vitamin B, Vitamin C, iron, copper and magnesium. These foods are only eaten, however, by villagers who have the ability to access them via local trade. Millet is a very desirable food in both Gyepo and Kale (it is commonly used to make bread), though it only appeared in the diet of very few villagers. Interview data suggest that reason for this is that millet is oftentimes more difficult to find than other items such as lentils and kidney beans.

Chili peppers, however, are a traded food to which many households have access; it is the key ingredient in the chili sauce that villagers consume with almost every meal. Oftentimes, one household in the village would organize a trade for a very large bag(s) of chilies and would either sell or trade a portion to other households in their own village. While poorer households make chili sauce simply with water and chilies, wealthier households (or those with access to a greenhouse), add cilantro, garlic, onions, and even tomatoes when they are available.

69 Most villagers have access to Tibetan salt (which contains no iodine) and the iodized salt that is provided by the Nepali government and sold in Simikot and along the footpath in the various teashops. During my fieldwork, I also conducted a project for UNICEF Nepal in Humla District, for which I tested whether the salt villagers were consuming contained sufficient iodine to counter health issues such as goiter. I tested salt from various households along the footpath from Simikot to Gyepo village, using a test kit provided by UNICEF. Additionally, I asked villagers about their salt preferences, and whether they knew about iodine, its benefits, and which salt it was in. The results from the study I conducted for UNICEF can be found in the Appendix (A7.1).
It is important to note that nearly all of the items acquired from the market in China, including white flour, wheat flour, white rice, and canola oil (see Table 7.4 for a complete list of market-purchased foods from Lhamo’s dietary assessment), have low nutrient density. They are, however, all easily stored, and thus play an important role in increasing villagers quantity-of-food-related food security (see Chapter Six). The primary reason these market-purchased foods have lower nutrient density is that they are almost all processed foods. The grains obtained from China are processed and refined, as opposed to the local grains, which are all whole. Other foods, such as ramen noodles, contain many additives like salt, vegetable oil, and corn syrup.

I included the aforementioned dietary assessment example to illustrate a typical diet. In the example I provided, it was the diet of an older woman in the non-road village who resides in a “wealthier” household that has access to locally grown, traded for, and market-purchased foods. The nuances of Lhamo’s diet (for example, the consumption of mustard vs. canola oil or enriched vs. whole grain) have many nutritional implications. In the next section of this chapter, I go into more detail about the nutritional consequences of the dietary patterns of villagers from both the road and non-road village. In doing so, I compare the diets of villagers not only across villages, but across seasons and genders as well. The aim of this analysis is to identify key macro- and/or micro-nutrients, as well as some staple vitamins and minerals that are lacking from the diet of villagers in Upper Humla.

Having spent numerous months in these villages, I am aware of what foods are possible to obtain as well as what foods are nearly impossible to gain access to in Upper Humla. Based on what is available, I will make dietary recommendations aimed at improving the general nutrition of villagers.

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70 Villagers from Gyepo also purchase all of their barley from the market in China, since it cannot grow in their village. I was not able to test whether there are in fact nutrition composition differences between the locally produced barley from Kale and the market-purchased barley that villagers from Gyepo consume.
7.3 Nutritional Implications of Macro-nutrient Consumption

7.3.1 Market-Purchased (Refined Grain) versus Locally Grown (Whole Grain)

The difference in nutrient composition of grains that are refined compared to grains that are whole is very significant. People who eat enough whole grains have a reduced risk of heart disease, diabetes, and cancer. Conversely, consuming refined versions of these grains leads to the development of chronic disease (Greenwood 2013). All of the grains that villagers in both Gyepo and Kale can purchase in China are refined (additionally, according to some villagers, much of the flour purchased in China was past its expiration date).\textsuperscript{71}

All grains come in an exterior shell (the bran), which is made up of many nutrient-rich layers. The bran protects and preserves the vital nutrients stored in the grain. Refined grains are processed— in the initial stage of processing, the bran of the grain gets damaged or cracked open, the inner elements are exposed to oxygen, and the vitamins and oils are destroyed in a very short time. Within 24 hours of grinding or cracking wheat, 40 percent of the nutrients have oxidized. Within 72 hours of processing, 90 percent of the nutrients have been destroyed (Whitney and Rolfes 2013). From that point on, the flour still maintains its mineral content and still has the same caloric value, but the vitamins and oils have essentially been destroyed.

The reason grain processing and refinement originally began, however, was that when you mill the bran and germ away, you create a product that has a longer shelf life. Although this decreased rates of food spoilage, it also created a product that was lacking in many essential vitamins and nutrients. In the 1930s, food scientists discovered that refined grains were not providing enough nutrients, and that this caused a rise in malnutrition, mostly in children. This led to the advent of enrichment and fortification—the procedure whereby a portion of vitamins gets reintroduced into the grain after it has been processed (Whitney and Rolfes 2013).

In contrast, when villagers consume locally produced grain (i.e. barley, wheat, bitter buckwheat) they are consuming whole grains. Whole grains are seeds that sprout during optimal

\textsuperscript{71} I heard from numerous sources (mainly men from Humla who purchase foods at the Chinese market) that much of the foodstuffs for sale were expired. Although I never personally saw expiration dates, many villagers indicated that the date on the large crates (in which the flour is transported to the market) was far in the past. I initially wanted to take some market-purchased flour to get it tested in the nutrition lab in Kathmandu (the lab at which I got locally produced food from Humla tested) but ultimately ran out of both the time and resources to do so.
conditions and, therefore, are loaded with nutrients for the plants (essential fatty acids, B vitamins, minerals, and macronutrients). They also contain fiber and resistant starch, which is a compound that helps prevent cancers, control blood sugar, and promote the growth of healthy gut bacteria (Jonnalagadda et al. 2011).

Barley is one of the whole grains produced in Kale; it is an excellent food choice as it contains important vitamins and minerals (i.e. niacin, thiamine, selenium, iron, magnesium, zinc, phosphorus, and copper), has minimal fat, is cholesterol-free (like all plant products), and contains a high amount of soluble and insoluble fiber. Soluble fiber is not only effective in lowering blood cholesterol (therefore reducing the risk of heart disease), but it also helps to slow the absorption of glucose, therefore reducing the risk of developing Type 2 diabetes. The insoluble fiber in barley may help the body maintain regular bowel function (and lower the risk of certain colon cancers), which is important for the Humli population given that many people frequently complained of “gastric” issues. Barley also contains antioxidants, which slow the rate of oxidative damage of molecules in the body, and are, therefore, very important for maintaining good health (Newman and Newman 2008).

Data suggest that villagers in Gyepo are consuming a higher percentage of processed, enriched grain as compared to the villagers from Kale (in part because they cannot grow their own barley, and in part because they have shifted away from agriculture at a higher rate than villagers from the non-road village, see Chapter Six). This difference has manifested itself in unequal amounts of fiber intake between the two villages.

7.3.2 Variability in Fiber Consumption

Fiber is a crucial component of good health. The subtraction of fiber from our diets is likely a major source of chronic disease (Newby et al. 2007). Low fiber intake has been linked to constipation, hemorrhoids, appendicitis, diverticulitis, and cancers, and, as was mentioned previously, is found in much greater quantities in whole grain than enriched grain (Whitney and Rolfes 2013).

72 The human body naturally produces free radicals and the antioxidants to counter their damaging effects. However, in most cases, the free radicals greatly outnumber the amount of antioxidants that the human body is able to produce on its own. To maintain this balance, and help the body keep up with the needed antioxidant production, the antioxidants need to come from the daily diet. Different antioxidants help different parts of the body, including the immune system, skin, heart, eyes, memory, and mood (Whitney and Rolfes 2013).
A substantial decrease of fiber in the diet is also a significant indicator that a population is progressing to Pattern Four of the nutrition transition. It recommended that men consume 38 grams of fiber per day, while women should consume 25 grams per day (HHS/USDA 2015). The following graph (Figure 7.3) illustrates that villagers are consuming, on average, the daily requirement of fiber, but it also shows that fiber consumption varies by village.

The average amount of fiber consumed in Kale is seven grams higher in the fall and eight grams higher in the spring than in Gyepo (which is roughly 25 percent of the daily recommended amount). Data suggest that, because villagers in Kale are eating a high proportion of whole grains, their intake of fiber is higher. Although villagers from both villages consume an adequate amount of fiber, the aforementioned data suggest that, because those living near the road consume less than those away from the road, the road could be causing a progression into Pattern Four of the nutrition transition.

The following graph (Figure 7.4) illustrates that men consume more fiber per day than women:
On average, men consume 17 more grams of fiber than women in Gyepo, and 14 more grams of fiber than women in Kale; men do, however, require roughly 13 grams of fiber more than women each day.

Villagers acquire a lot of their fiber from potatoes, which are a diet staple in both villages (potato provides 7 percent of the recommended amount of dietary fiber in one serving), in addition to the whole grain in their diets. Not only are whole grains a great source of fiber, they are also a good source of carbohydrates. Carbohydrates are important because they provide the brain with the glucose it needs to function. If an individual does not consume an adequate amount of carbohydrates, proteins that are needed to build and repair muscles and other tissues are diverted away from their primary function and are turned into glucose (Whitney and Rolfes 2013). In the following section, I assess villagers’ consumption of carbohydrates.

### 7.3.3 Overall Carbohydrate Consumption

There is no standard daily-recommended intake for carbohydrates; instead, it is recommended that carbohydrates comprise of 45 percent to 60 percent of one’s daily caloric intake (HHS/USDA 2015). Given that villagers’ caloric intake is variable, it can be assumed that their intake of carbohydrates would also be variable. The following table (Table 7.6) illustrates villagers’ daily intake of carbohydrates in grams and as a percentage of their daily caloric intake.
Table 7.6: Villagers’ average daily carbohydrate intake

<table>
<thead>
<tr>
<th>Village</th>
<th>Carbohydrates (g)</th>
<th>Percent Of Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale Village Fall</td>
<td>436</td>
<td>11</td>
</tr>
<tr>
<td>Kale Village Spring</td>
<td>405</td>
<td>13</td>
</tr>
<tr>
<td>Gyepo Village Fall</td>
<td>425</td>
<td>10</td>
</tr>
<tr>
<td>Gyepo Village Spring</td>
<td>379</td>
<td>13</td>
</tr>
</tbody>
</table>

The amount of carbohydrates consumed by villagers is roughly the same across both of the villages during both seasons (379g – 425g). However, on average, only 10 percent to 13 percent of villagers’ daily calories are comprised of carbohydrates. This is interesting, considering that all of the locally grown foods in both villages (barley, bitter buckwheat, wheat, potato, and daikon radish) are excellent sources of carbohydrates. This data indicate that the majority of villagers’ daily calories must be coming from another source. Upon careful inspection of the dietary assessments, it became apparent that the majority of villagers’ calories are in fact coming from the yak butter tea that they consume (which is also illustrated in Lhamo’s dietary profile).

7.3.4 Overall Fat Consumption

Although one gram of fat contains more calories (nine kcal/gram) than either a gram of protein or carbohydrate (each contains four kcal), fat is an important fuel source for energy. Avoiding fats can be very detrimental to your health. However, selecting the wrong types of fats can also be very damaging (Greenwood 2013).

After spending time in Upper Humla and reviewing dietary profiles, it became evident that villagers consume a lot of fat in their diets, mainly from the large quantities of butter tea, yak milk, and various types of oils. It is recommended that fats comprise of 20 percent to 35 percent of an individual’s daily calories (HHS/USDA 2015). The following table (Table 7.7) illustrates, on average, the calories from fat that villagers consume.

Table 7.7: Villagers’ average daily fat intake

<table>
<thead>
<tr>
<th>Village</th>
<th>Calories from Fat (kcal)</th>
<th>Percent of Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale Village Fall</td>
<td>1311</td>
<td>34</td>
</tr>
<tr>
<td>Kale Village Spring</td>
<td>832</td>
<td>25</td>
</tr>
<tr>
<td>Gyepo Village Fall</td>
<td>1591</td>
<td>35</td>
</tr>
<tr>
<td>Gyepo Village Spring</td>
<td>698</td>
<td>24</td>
</tr>
</tbody>
</table>
The data illustrate that on average, villagers are consuming an adequate amount of fat in their diets. It also shows that they are consuming more calories from fat in the fall than in the spring. Interview and FFQ data suggest that this consumption pattern is heavily dictated by the fact that villagers consume dairy products (which are high in fat, but also in nutrients such as calcium) nearly every day in two months of the fall, yet they very rarely consume dairy in the spring. The following graph (Figure 7.5) illustrates the percentage of households in both villages who consume dairy on a daily basis:

FIGURE 7.5: DAILY CONSUMPTION OF DAIRY ACROSS SEASONS

It is notable that in the fall, a much higher percentage of households in Gyepo are consuming dairy daily than in Kale. Ethnographic data suggest that this difference is related to the topography of the villages. Gyepo is very flat compared with the Kale (see Chapter 2); thus most households do not have to let their animals roam far to graze. Given that the distance to the household is relatively short, villagers have easier access to dairy on any given day in the fall. In Kale, however, due primarily to the steep landscape, animals are taken very far away from the village to graze after the majority of the harvest tasks are complete. Because the distance between the households and where animals graze is much further in Kale, villagers have less access to dairy on a daily basis.

Aside from dairy, another source of fat in villagers’ diets is oil. Most villagers consume oil multiple times per day. Primarily, villagers use it to sauté vegetables (for example, Lhamo consumes an average of four teaspoons of oil per day, and that equals approximately 162 fat
calories). Although some oil is very nutritious (i.e. mustard oil), other oils (i.e. vegetable oils) have negative nutritional implications (Greenwood 2013). In the next section, I discuss the nutritional differences between consuming locally sourced mustard oil compared to market-purchased vegetable oil. I begin with a short explanation of omega-6 and omega-3 fatty acids, and how the increased consumption of vegetable oil in the non-road village is disturbing the fatty acid balance in the diets of individuals.

7.3.5 Vegetable Oil Consumption Increases Omega-6/Omega-3 Ratio

The human body is capable of producing all of the fatty acids it needs aside from two: linoleic acid, an omega-6 fatty acid, and alpha-linolenic acid, an omega-3 fatty acid (Simopoulos 2008). Because the human body cannot produce these polyunsaturated fatty acids, they have to be consumed from the diet and are therefore often called “essential fatty acids.” Scientific research suggests that our hunter-gatherer ancestors consumed omega-6 and omega-3 fats in a ratio of roughly 1:1 (De Lorgeril and Salen 2003). Research also suggests that ancient and modern hunter-gatherers were free of the modern inflammatory diseases, like heart disease, cancer, and diabetes that are the primary causes of death and morbidity today (Kris-Etherton et al. 2000). Thus, the concept of an “ideal” ratio of omega-6 to omega-3 fatty acids in the diet was developed.

It is now widely known that excessive amount of omega-6 fatty acids and a very high omega-6/omega-3 ratio causes the excess omega-6 fatty acids to build up in cell membranes and contribute to inflammation. This inflammation is the underlying factor in some of the most common Western diseases, including cardiovascular disease, cancer, diabetes, and arthritis. Too high an omega-6/omega-3 ratio has also been cited as a leading cause of autoimmune disease, obesity, depression, hyperactivity, and even a tendency towards violence (Hibbeln et al. 2006, Kang 2003, Simopoulos 2008). On the contrary, a more equal ratio exerts suppressive effects.

This marked shift in the ratio of omega-6 to omega-3 fatty acids occurred most notably in the Western diet at the onset of the Industrial Revolution. At this time, vegetable oil rose in popularity and cereal grains were increasingly used as feed for domestic livestock. Vegetable oils, such as soybean, sunflower, and canola oil, are extremely high in omega-6 fatty acids.
According to interview data and the results from the dietary assessment, the oil that Humli villagers purchase at the market in China is all vegetable oil, and therefore very high in omega-6.

As previously discussed (see Chapters Two and Chapter Six), the villagers in Gyepo grow a much larger quantity of mustard and therefore are able to cook food almost solely with mustard oil. Kale villagers, however, although they do grow mustard, have to supplement their production with vegetable oil that they purchase from the market in China because they simply cannot meet their cooking demands with the limited amount of mustard that they grow.

This difference in the type of oil that villagers consume is one of the major differences in the dietary patterns of the two villages. Because villagers from Kale almost exclusively consume vegetable oil, they increase their omega-6/omega-3 ratio at a much higher rate and are thus putting themselves at a much greater risk for the aforementioned diseases. To achieve a more equal omega-6/omega-3 ratio, villagers could increase their intake of omega-3 fatty acids (flaxseeds have a large amount, though other foods that do, such as sardines, salmon, and beef, would be difficult to acquire in Humla) or decrease their consumption of omega-6.

The dietary assessment information illustrates that a much higher percentage of villagers’ diets comes from fat than from carbohydrates, and that the types of fats that villagers are consuming varies between the villages, which is impacting villagers’ nutritional health differently. In the following section, I address villagers’ intake of the third macro-nutrient–protein.

### 7.3.6 Overall Protein Consumption

According to the USDA (2016), 10 percent to 35 percent of calories consumed per day should come from protein. Protein is essential for human development and health because it aids with growth (especially of children, teens, and pregnant women), helps repair tissues, supports immune functions, creates essential hormones and enzymes, preserves lean muscle mass, and is used as energy when carbohydrates are not available. Protein is found in a variety of food sources, including meats, poultry, fish, meat substitutes, cheese, milk, nuts, legumes, and in smaller quantities, starchy foods and vegetables.

When these types of protein-rich foods are consumed, the human body breaks down the protein into amino acids (the building blocks of proteins). While humans are able to produce
some amino acids (nonessential amino acids), others must be acquired from the diet (essential amino acids) (Whitney and Rolfes 2013). In general, “complete proteins,” or those that contain all of the essential amino acids, are derived from animal foods (meat, fish, dairy products, eggs). Other sources of protein, including nuts and seeds, legumes, grains, and vegetables, are considered ‘incomplete proteins,” meaning they not contain adequate amounts of the nine essential amino acids.

Although at first glance it may seem as though villagers in both villages are mostly consuming an adequate amount of protein (based on the total grams consumed), it is important to examine where the protein is coming from, as the protein source dictates how many essential amino acids the consumer receives. Considering that ethnic-Tibetan Humlis do not have access to fish, eat meat under rare circumstances (when an animal dies of natural causes), and only consume dairy in some months of the year, it is often difficult to acquire an adequate amount of “complete proteins.”

Interview data suggest that egg consumption may be the best option to increase complete protein intake.

7.3.7 Eggs As Avenue to High Protein Quality

Egg consumption in Upper Humla is extremely varied. When I asked people in both villages whether households have ever tried to raise chickens for egg production, almost all responded that this is impossible because wolves have been known to eat the chickens at night. When I asked about the possibility of building a fence to protect the chickens, many did not express any interest. The difference in the egg consumption between the villages, however, stems from the fact that people in Gyepo can purchase eggs from the market in China and will bring them via truck for consumption in the village.

Based on the dietary assessment data, many households in Gyepo consume eggs a few times per month, in contrast to the villagers in Kale, who do not consume eggs at all. Typically when I reached the “eggs” item on my FFQ, for example, villagers in Kale would respond almost in a laughing manner by replying, “Not here, not in our village; we do not get any eggs”. Although villagers could technically bring eggs back from the market in China, they do not because they believe they are too fragile and will break in transport.
The following two tables (Table 7.8 and 7.9) provide an illustration of the difference in protein quality (based on the amount of the nine essential amino acids consumed) of two individuals. The first table is the protein quality of the diet of an individual living in Kale who does not have access to eggs, and the second table is the protein quality of the diet of an individual living in Gyepo who reported consuming one egg per week (aside from the difference in egg consumption, the dietary intake of these two particular villagers is quite similar).

Table 7.8: Protein quality of a typical diet [individual, Kale village, fall season]  

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Actual Ratio</th>
<th>Ideal Ratio</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histidine</td>
<td>3.48 ± 18</td>
<td>=</td>
<td>19%</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>5.66 ± 25</td>
<td>=</td>
<td>22%</td>
</tr>
<tr>
<td>Leucine</td>
<td>10.33 ± 55</td>
<td>=</td>
<td>18%</td>
</tr>
<tr>
<td>Lysine</td>
<td>6.09 ± 51</td>
<td>=</td>
<td>11%</td>
</tr>
<tr>
<td>Methionine + Cystine</td>
<td>4.68 ± 25</td>
<td>=</td>
<td>18%</td>
</tr>
<tr>
<td>Phenylalanine + Tyrosine</td>
<td>11.75 ± 47</td>
<td>=</td>
<td>24%</td>
</tr>
<tr>
<td>Threonine</td>
<td>4.57 ± 27</td>
<td>=</td>
<td>16%</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>1.74 ± 7</td>
<td>=</td>
<td>24%</td>
</tr>
<tr>
<td>Valine</td>
<td>6.74 ± 32</td>
<td>=</td>
<td>21%</td>
</tr>
</tbody>
</table>

Table 7.9: Protein quality of a typical diet [individual, Gyepo village, fall season]  

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Actual Ratio</th>
<th>Ideal Ratio</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histidine</td>
<td>9.64 ± 18</td>
<td>=</td>
<td>54%</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>17.46 ± 26</td>
<td>=</td>
<td>69%</td>
</tr>
<tr>
<td>Leucine</td>
<td>25.87 ± 55</td>
<td>=</td>
<td>54%</td>
</tr>
<tr>
<td>Lysine</td>
<td>21.22 ± 51</td>
<td>=</td>
<td>41%</td>
</tr>
<tr>
<td>Methionine + Cystine</td>
<td>13.07 ± 25</td>
<td>=</td>
<td>52%</td>
</tr>
<tr>
<td>Phenylalanine + Tyrosine</td>
<td>33.27 ± 47</td>
<td>=</td>
<td>70%</td>
</tr>
<tr>
<td>Threonine</td>
<td>14.09 ± 27</td>
<td>=</td>
<td>52%</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>4.92 ± 7</td>
<td>=</td>
<td>70%</td>
</tr>
<tr>
<td>Valine</td>
<td>20.54 ± 32</td>
<td>=</td>
<td>64%</td>
</tr>
</tbody>
</table>

Ideally, an individual’s protein quality, based on their consumption of the nine essential amino acids, would yield a score somewhere between 75 percent and 100 percent (as illustrated on the above tables). Note that the villager in Kale who does not consume eggs has a protein quality of less than 25 percent, while the villager in Gyepo who consumes eggs has a protein quality of 54 percent.

73 This protein quality data was generated using The Food Processor database.
quality between 25 percent and 50 percent, which still is not ideal, but is far better than the non-egg consumer.

This example indicates that even the consumption of one egg per week can greatly increase the intake of essential amino acids and therefore the quality of the protein that is being consumed. However, since the human body does not store any excess amino acids, it is crucial that the nine essential ones are consumed each day. If they are missing from the diet, the body’s first response is to break down the muscle tissue to access the amino acid it contains, so it can use them elsewhere (Whitney and Rolfes 2013). Therefore, muscle wasting is the first symptom of a deficiency of essential amino acids. Other physical effects can include decreased immune response, gender weakness and fatigue, and changes to the texture of skin and hair (Lucas et al. 1986).

In general, the data indicate that people from both villages are not getting enough “complete proteins.” Given how much Humli villagers use their bodies on any given day (i.e. much of their work involves manual labor), it is extremely important that they eat enough protein to rebuild their muscles and tissues. Many of the physical complaints that I heard from villagers involved aching muscles, soreness, general weakness, and fatigue. Based on the acquired dietary data, I am certain that some individuals would see a reduction in these types of physical ailments if they increased their consumption of “complete proteins.”

In the aforementioned sections, I discussed villagers’ caloric intake, their average intake, and the nutritional implications of their macro-nutrient consumption (carbohydrates, fats, and proteins). My data confirm that although there is both intra-village and intra-household variation across consumption levels, in general, villagers are consuming enough fat and receive enough fiber from their diet. The problem lies in the fact that carbohydrates, in general, comprise of too low a percentage of villagers’ daily calories, and that individuals are not consuming enough “complete proteins.” In this next section, I shift from discussing macro-nutrient consumption and its impacts to micro-nutrient consumption and its nutritional implications for villagers.

### 7.4 Nutritional Implications of Micro-nutrient Consumption

I chose the following micronutrients to discuss: vitamin A, vitamin C, iron, and zinc. That is because villagers, on average, are not obtaining adequate amounts of these micro-
nutrients from their diet. In contrast, the dietary assessment data show that most villagers are consuming adequate levels of both vitamin E and vitamin K.

Villagers’ vitamin E consumption largely comes from the daikon radish, a staple vegetable for Humlis as it grows well in harsh, high alpine climates. Every household in both villages grows daikon radish. One serving of daikon radish provides 9 percent of the daily-recommended intake of vitamin E. Another benefit of this vegetable is that it stores very well. Villagers shred the vegetable and dry it in the sun and then store it for consumption throughout the winter months (see Figure 7.6). Villagers even call the radish a different name depending on if it is fresh (mulla) or dried (asure).

![Villagers shredding and drying daikon radish for winter storage](image)

Villagers acquire most of their vitamin K from chili peppers, which are eaten almost daily and contain 4 percent of the daily requirement in just one teaspoon. Additionally, villagers acquire vitamin K from greenhouse vegetables, which villagers tend to share among households.
Additionally, those villagers in Kale obtain some vitamin K from canola oil,\textsuperscript{74} which provides 12 percent of the daily requirement per teaspoon (HHS/USDA 2015).

### 7.4.1 Lack of Vitamin A

While vitamin A deficiency is rare in developed nations, it remains a concern in developing countries, particularly in areas where poor nutrition is common. Vitamin A helps form and maintain healthy teeth, skeletal and soft tissue, mucus membranes, and skin. Individuals with prolonged vitamin A deficiency can develop xerophthalmia (dry eye), which can ultimately lead to night blindness or total blindness, as well as skin disorders, infections (i.e. measles), diarrhea, and lung disorders (Whitney and Rolfes 2012).

On numerous occasions while I was conducting fieldwork, villagers complained to me about having severe dry eyes (a sign of insufficient vitamin A consumption). Additionally, many villagers complained of having itchy skin, which, although it can also be a byproduct of poor hygiene, can also be a sign of hyperkeratosis (or dry, scaly skin caused by a deficiency in vitamin A).

The following table (Table 7.10) illustrates that villagers’ average vitamin A consumption levels (as measured by RAE) are notably less than the recommended daily intake levels. Vitamin A is measured both in International Units (IU), which is how it is often stated on product labels, and in RAE (retinol activity equivalents), which is the unit of measure more often used in nutritional studies.

\textsuperscript{74} Again, since a lot of mustard is grown in Gyepo, villagers use mustard oil for cooking and do not purchase canola oil from China. Canola oil, although generally not good for health, does contain some vitamin K.
Table 7.10: Average daily intake of vitamin A (RAE) [village, season, gender]

<table>
<thead>
<tr>
<th></th>
<th>Vitamin A (mcg/day)</th>
<th>Gender Diff.</th>
<th>Recommended</th>
<th>Foods w/High Vitamin A Content*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale</td>
<td>501</td>
<td>Females = 482</td>
<td>900 mcg/day</td>
<td>Sweet Potato</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Males = 532</td>
<td>males ≥ 14,</td>
<td>Carrots</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>700 mcg/day</td>
<td>Dark Leafy Greens</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>females ≥ 14</td>
<td>Squash, Pumpkin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>years,</td>
<td>Romaine Lettuce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(770 mcg/day</td>
<td>Dried Apricots</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>during pregnancy and</td>
<td>Cantaloupe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,300 mcg/day</td>
<td>Sweet Red Peppers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>during lactation)</td>
<td>Tuna Fish</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tropical Fruit (Mango)</td>
</tr>
<tr>
<td>Gyepo</td>
<td>332</td>
<td>Females = 293</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Males = 532</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The highlighted foods are available in Upper Humla

The data illustrate that, in general, those in Kale are consuming more vitamin A per day than those in Gyepo (501 and 332 mcg/day, respectively). However, these consumption levels indicate that individuals from both villages are not consuming anywhere close to the daily-recommended values. Notably, while vitamin A consumption for males is equal across both villages, women in Gyepo consume much less than in those in Kale.

Villagers from both villages get vitamin A primarily from leafy greens (from their greenhouses), as well as from milk and other dairy products in the fall. Dietary assessment data indicate that the primary difference between consumption in the villages is because households in Kale grow far more pumpkin in their greenhouses (pumpkin is an excellent source of vitamin A, with one cup containing 706 RAE, the daily recommended amount for women). For some reason, although villagers in Gyepo certainly could grow pumpkin, this vegetable is not as popular. The lack of this vegetable in the diets of those in Gyepo is manifesting itself in their lack of vitamin A.

7.4.2 Lack of Vitamin C

According to Shaik and Conti (2016), higher blood levels of vitamin C may be the overall marker for good health. Vitamin C protects human health in numerous ways, including
cardiovascular, cancer, stroke, eye health, and immune system defense. Low intake of vitamin C can compromise many bodily functions, such as the body’s to rid itself of cholesterol and fight off infections and other diseases, such as cardiovascular and allergic diseases (Arnson 2013).

Much research however, shows that the ideal dosage of vitamin C is closer to 500mg/day; this is much higher than the recommended dose of 90mg/daily for men and 75mg/daily for women (HHS/USDA 2015). Because it is often difficult to eat five servings of fruits or vegetables per day (which is what you would need to do to reach 500 mg of vitamin C per day), many people are advised to consume a daily supplement. The following table (Table 7.11) illustrates that most villagers in Gyepo and Kale are not even consuming the (seemingly low) recommended dose of vitamin C.

Table 7.11: Average daily intake of vitamin C [village, season, gender]

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Fall</th>
<th>Spring</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale</td>
<td>77</td>
<td>83</td>
<td>71</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>Gyepo</td>
<td>54</td>
<td>56</td>
<td>52</td>
<td>52</td>
<td>63</td>
</tr>
</tbody>
</table>

Women in Kale (indicated by the highlighted section) are the only group consuming the recommended daily dose of vitamin C, though from the aforementioned data, it is clear that villagers in Kale consume a higher amount of vitamin C than those in Gyepo.

The foods that have the highest content of vitamin C are fruits and vegetables, most notably bell peppers, guava, dark leafy vegetables, kiwi, broccoli, berries (strawberries), citrus fruits (oranges), peas, and papaya. Because both Gyepo and Kale lie at too high of an altitude to grow fruits, villagers’ only option to procure these vitamin C-rich foods are from their greenhouses, local trade with villagers living at lower elevation (where fruits trees can grow), or from the market in China. According to the FFQ data, 0 percent of households in both villages across both seasons are eating fruit daily. Interview data suggest that although it is possible to purchase fruits from the market in China (banana, pear and orange), only about two to three households in Gyepo are actually doing so, and if they do, the fruit is always consumed on the way back to the road village by the men who made the trip to the Chinese market.

Since villagers are not able to eat fruit, they acquire almost all of their vitamin C from potato (42 mg/medium potato), daikon radish (74 mg/large radish), and chili pepper (182 mg/.5 cup), which provides an incredibly high amount of vitamin C. Villagers from both villages
consume chili peppers with almost every meal in the form of spicy sauce (*achar*). Because chili peppers do not grow in either village, however, villagers most often trade for them. According to interview data, the amount of chili peppers that an individual consumes most often correlates to the socioeconomic status of the household, as wealthier households have the ability to trade for more chilies.

In addition to a low vitamin C intake compromising many bodily functions, a low intake can also compromise an individuals’ ability to absorb the mineral iron (Lynch and Cook 1980).

### 7.4.3 Iron

Without enough iron, the body cannot make adequate healthy oxygen-carrying red blood cells. This essentially deprives the entire body of oxygen. According to the WHO (2013), iron deficiency is the most widespread nutritional disorder worldwide. In the United States, low iron is also the most common nutritional deficiency, with almost 10 percent of women being iron deficient (HHS/USDA 2015). The most frequently cited symptom of iron deficiency is exhaustion, which is oftentimes difficult to detect, especially in environments such as Humla where nearly everyone complains about tiredness and exhaustion. Iron deficiencies can also lead to shortness of breath (due to low oxygen levels), dizziness and headaches (due to less oxygen reaching the brain), and heart palpitations, which often leads to anxiety attacks (NIH 2016).

The amount of iron one needs depends on age, gender, and overall health. Infants and small children need more iron than adults, primarily because their bodies are growing at a fast rate. During childhood, the amount of iron required for boys is the same as it is for girls (10mg/day from ages four to eight, and eight mg/day from ages nine to 13). After age 13 however, women require much more iron per day (18mg/day) because they lose blood each month during their menstrual cycle (men only need eight mg/day). For this reason, it is more common for women (of menstruating age) to have iron deficiencies than men. After menopause, a woman’s iron needs drops back to eight mg/day.

The following table (Table 7.12) shows the average level of iron being consumed per day by villagers in both villages.
Table 7.12: Average amount of iron consumed by village and gender

<table>
<thead>
<tr>
<th></th>
<th>Iron (mg)</th>
<th>Gender Diff.</th>
<th>Recommended</th>
<th>Foods w/High Iron Content*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale</td>
<td>22</td>
<td>Females = 19&lt;br&gt;Males = 26</td>
<td>8 mg/day males ≥ 13, 18 mg/day females &gt; 13 years, 8 mg/day females in menopause</td>
<td>Red Meat&lt;br&gt;Pork&lt;br&gt;Poultry&lt;br&gt;Seafood&lt;br&gt;Beans</td>
</tr>
<tr>
<td>Gyepo</td>
<td>26</td>
<td>Females = 17&lt;br&gt;Males = 22</td>
<td></td>
<td>Dark leafy greens (spinach)&lt;br&gt;Dried fruit (apricots)&lt;br&gt;Iron-fortified cereals&lt;br&gt;Peas</td>
</tr>
</tbody>
</table>

*The highlighted foods are available in Upper Humla*

The data illustrate that men in both Gyepo and Kale are consuming enough iron (26mg/day and 22mg/day, respectively). When data are aggregated (see Table 7.12), women are getting just enough in Kale (19 mg/day) and just under the daily requirement in Gyepo (17 mg/day). However, the individual data illustrate that the daily iron intake for women in Kale ranges from 8 mg/day to 37 mg/day, while in Gyepo it ranges from 7 mg/day to 34 mg/day. Based on the dietary assessment data, 45 percent of the women in Kale are iron deficient, and 67 percent of the women in Gyepo are iron deficient.

The fact that there are two types of iron (heme and nonheme) compounds the issue of reduced iron intake (Whitney and Rolfes 2013). While heme iron comes from animal-based foods and is easily digested, nonheme iron, which comes from plant-based foods, is difficult to absorb. The only way to increase the rate of nonheme iron absorption is to consume vitamin C simultaneously (Lynch and Cook 1980). Although there is no way to confirm the exact percentage of consumed iron that villagers are actually absorbing, it is safe to assume that with such low levels of vitamin C consumption (see Table 7.11), some nonheme iron is most likely not being absorbed. This would indicate that the daily iron levels shown in Table 7.12 (which put women in both villages right on the cusp of consuming enough iron/day) might be slightly inflated.

In both villages, there is a large volume of dried apricots that villagers press into oil and use primarily on their skin and hair (both to combat muscle aches and as a type of moisturizer). Although I did see some villagers consume these apricots, this was an infrequent occurrence. When I asked villagers what they primarily do with the actual fruit part of the apricot, many told me that they add them to the food that they prepare for the cattle. Dried apricots are an excellent source of iron; if the health benefits of consuming these fruits were explained to women, this
could be a potential solution to both the iron and vitamin C deficiency that exists in both villages. Additionally, the skin of the potato (which I noticed all villagers peel off and do not eat), is a very rich source of iron; by discarding this part of the potato, villagers are not getting as much iron (or as many other nutritional benefits) as they would be if they consumed the entire vegetable.

7.4.4 Zinc

Zinc is a trace element responsible for a number of different functions in the human body and is important for a healthy immune system, properly synthesizing DNA, promoting healthy growth during childhood, and playing a role in the body’s ability to heal itself after an injury (Whitney and Rolfes 2013). According to Shankar and Prasad (1998), zinc-deficient persons experience increased susceptibility to a variety of pathogens. Because inadequate intake makes a person more susceptible to disease and illness, reports say zinc deficiency is responsible for over 800,000 childhood deaths in the world every year (WHO 2015).

Maternal zinc deficiency may also compromise infant development and lead to poor birth outcomes (Darnton-Hill 2013). According to Chaffee and King (2012), poor maternal zinc status has been associated with fetal loss, intra-uterine growth retardation, reduced birth weight, prolonged labor, and preterm or post-term deliveries.

Even though only a small amount of zinc is necessary to acquire all of its benefits (roughly 8 mg/day for women and 11 mg/day for men), the following table (Table 7.13) shows that villagers in Upper Humla are not consuming even close to the recommended daily amount.

<table>
<thead>
<tr>
<th>Table 7.13: Average amount of zinc consumed by village and gender</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zinc (mg)</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Kale</td>
</tr>
<tr>
<td>Gyepo</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*The highlighted foods are available in Upper Humla*
Most foods high in zinc are of animal origin, such as seafood, beef/lamb, and pork/chicken. In Upper Humla, access to these foods is nearly impossible because villagers live in the high mountains (i.e. seafood) or is rarely consumed due to religious beliefs (i.e. meat). The zinc in local Humli foods (found in cereals, nuts, and legumes) is difficult to absorb because these foods are simultaneously high in fiber, which makes zinc absorption more difficult (Ruel et al. 1997, Black 1998). Frequent diarrhea, which is a common complaint in Gyepo and Kale, may also further deplete the body’s stores of zinc.

For populations and/or individuals who are not consuming an adequate amount of zinc via their diets, supplementation is an option. Current research suggests that zinc supplementation has a variety of benefits, including the prevention of diarrhea and pneumonia episodes (as well as possibly malaria), in addition to improving the outcomes of both acute and long-term diarrhea (Ruel et al. 1997).

In 2005, the Ministry of Health and Population in Nepal requested assistance from the United States Agency for International Development (USAID) to support the integration of zinc into the government’s diarrhea management program. Although many programs have been implemented since then throughout the country, my data highlight that zinc supplementation is still needed in both of my field site villages.

Not only would increasing zinc intake decrease individuals’ susceptibility to various disease pathogens, but it would also help individuals heal more quickly after an injury. Considering the lack of medical care available in Humla, many small injuries or infections have much worse outcomes than often expected. Increasing zinc consumption could help to alleviate some of the cases where untreated minor scrapes/injuries because serious, life-threatening issues.

Two other dietary additives that are important to examine are Chinese alcohol and added sugar; both of these items have negative health impacts and access to them has been made much easier with the construction of the new road.

7.5 The Road and Unhealthy Dietary Additives

Traditionally, Humlis have brewed their own beer made from barley (nechang). Although beer often has a bad reputation for its negative impacts on health, it has a number of antioxidants, vitamins, and minerals (i.e. iron) that can both help prevent heart disease and rebuild muscle. As
previously discussed in this chapter, with barley being a whole grain, villagers are also getting fiber, potassium, folate, and vitamin B when they drink local nechang. Also, beer is 93 percent water, so it is also a good source of hydration (especially since Humli villagers drink far less water than they should ideally be consuming per day). The following photograph (Figure 7.7) shows nechang being made; it is a process that takes multiple days. Villagers make an average of 10 batches per year when the weather is nice, which lasts them throughout the long winter months.

Figure 7.7: Brewing local beer made from barley

Aside from when I was traveling longer distances with local villagers on foot, I rarely saw villagers drinking water throughout the day. Of course, villagers would drink water upon arriving at the house from a long day’s work, but they are not in the habit of talking it with them into the fields or on other daily tasks. Given that this practice of not consuming water is relatively normal, the consumption of nechang does help hydrate villagers.
The problem however, is not so much the consumption of the local barley beer, or even the distilled barley liquor that villagers consume (which again, is similar to a Japanese saké), but with the fact that a very high quantity of high-proof, heavily distilled alcohol is coming across the border into Humla via the new road.

7.5.1 Chinese Alcohol

The arrival of high-proof Chinese liquor has caused numerous problems in the villages; these problems not only pertain to villagers’ health, but also are in the form of social conflicts (i.e. individuals not doing daily tasks due to intoxication, domestic violence, intra-village conflicts over alcohol consumption). These health and social issues have increased so much over the years that the Nepali government has made it illegal to both import and sell Chinese liquor in Humla.

Despite its illegality, numerous families continue to purchase and sell the liquor from their homes and/or their restaurants. According to one 37-year-old man who lives along the footpath, a three-day walk east of Gyepo village, “What am I to do? There are no other ways to earn money in Humla. I know it is illegal, but I need to support myself and my family.” This response came during a conversation that took place after the Nepali government raided his hotel/restaurant (see Figure 7.8). In the raid, the officers thoroughly searched the home and destroyed his entire Chinese alcohol inventory that he was planning to sell throughout the winter months (in total 87 crates of liquor).
When I asked him how he managed to get the Chinese liquor through the government checkpoints at the border, he told me that the police take bribes and will let them through. According to him, “Most often, the Nepali police turn a blind eye, especially if they are making money with bribes, but then every so often they have to look good for the ones in charge, so they do a raid, and report to their superiors that they are doing their jobs.”

In Tibetan culture, women are not stigmatized for drinking alcohol. Many women in both of my field site villages enjoy drinking, and some make it a daily ritual. However, according to both observation and the dietary assessment results, it is nearly all men (of all ages) who are the ones consuming the Chinese liquor. In nearly every household where I conducted an interview, women reported drinking, though only either the local barley beer or liquor. Men on the other hand, drink all three. Interview data suggest that in the two villages, there are only two women who regularly consume the Chinese liquor, and it is widely known that they both are battling alcohol addiction problems.
The following graph however (Figure 7.9), illustrates average daily alcohol consumption levels. Notably, it illustrates that alcohol consumption is higher in Gyepo than in Kale (for both men and women).

![Figure 7.9: Average daily alcohol consumption](image)

To provide context, a standard drink (a 12-ounce bottle of beer, a five-ounce glass of wine, or .6 fluid ounce of pure alcohol) contains 10 grams of ethyl alcohol. This indicates that while women in both villages and men in Kale are drinking between three and six drinks per day, men in Gyepo are drinking closer to 19 drinks per day. These numbers appear shocking, but it is important to keep in mind that many of the men in Gyepo are drinking primarily nechang (which has a relatively low alcohol content of anywhere between 3 to 3.6 percent), and they do tend to drink slowly throughout the day instead of having all of the drinks in one sitting. According to reports, however, it is the relatively recent addition of the high-proof Chinese liquor that is causing most of the social and health problems. Interview data also suggest that boys as young as 16 have begun to drink the Chinese liquor. Most often, these are the children who are not in school but who engage in tasks around the village such as the local trade. These boys and young men consume the Chinese liquor at night at hotels/restaurants along the footpath on their journey to local trade or to the Chinese market.

Another interesting trend the data illuminate is that women in Gyepo are actually drinking more per day, on average, than both men and women in Kale. Interview data suggest
that the fact that alcohol consumption is higher in Gyepo is because the culture around alcohol consumption is changing.

Traditionally, villagers would consume alcohol in pairs or in small groups, typically inside in someone’s home (next to the hearth) or on the rooftop when the weather was favorable. In Gyepo, since the arrival of numerous small restaurants and teashops along the road, villagers have the option of drinking at these establishments as well. During numerous nights, I would sit in these restaurants and watch people stay for hours drinking with friends, being encouraged, and encouraging others, to continue drinking. This “herd mentality” has certainly caused the overall alcohol consumption to increase at a faster rate in Gyepo than it has in Kale.  

Not only is this heightened alcohol consumption causing social disputes, but it also has severe, long-lasting health impacts. Although cirrhosis of the liver is arguably the most well-known health impact of high levels of alcohol consumption, researchers have linked alcohol consumption to more than 60 unique diseases (anemia, cardiovascular disease, cancer, dementia, depression, and seizures, to name a few) (Whitney and Rolfes 2013). Heavy drinking is also associated with an increased risk of developing an ulcer, as large quantities of alcohol irritate the stomach lining, increasing inflammation. If the inflammation becomes severe, bleeding may also occur (this condition is known as gastritis) (Bujanda 2000).

7.5.2 Sugar

Traditionally, sugar consumption in the Humli diet was limited to the following natural sugars: 1.) Glucose, which occurs in plants and fruits and can be burned as energy or converted into glycogen (fuel for both muscles and the liver), 2.) Fructose, the sugar that occurs in fruit, and 3.) Sucrose, which is found alongside glucose in certain fruits and plants (and also in the stems of sugar cane) (Whitney and Rolfes 2013). Although these types of foods do contribute to

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76 According to Jhingan et al. (2003), there have been no large-scale surveys carried out in Nepal regarding alcohol consumption, despite the general perception that alcohol is causing significant physical and social harm in the community. However, some localized studies of alcohol consumption have been executed; for example, Niraula et al (2004) examined alcohol use among women in eastern Nepal and Luitel et el. (2013) assessed the prevalence of alcohol consumption among Bhutanese refugees in Nepal and Dhital et al. (2001) assessed alcohol and drug use in Nepal among children more generally.
overall sugar intake, they generally cause less of a blood sugar spike compared to nutrient-void table sugar or high-fructose corn syrup.\textsuperscript{77}

Since the arrival of the road, villagers have much easier access to nutrient-void table sugar and food items with high-fructose corn syrup. Examples of these items are soda pop, chocolate bars, chips, and candy. Interview data indicate that villagers from Gyepo are bringing back these items for consumption in their homes and to sell in their stores. In contrast, villagers from Kale rarely bring these “extra” items back with them for consumption in their village, as they typically have to carry all of the market-purchased foodstuffs on their backs or on the backs of animals. With limited space, villagers from Kale typically limit the types of food they purchase to grain, vegetable oil, and spices. It is also important to note that processed foods (such as the market-purchased grain) contain a high amount of sugar. Generally, the more refined (processed) the food, the more likely our bodies have to convert it to sugar to process and digest properly.

The WHO recommends that both adults and children should reduce the intake of “free sugars” to less than 10 percent of total energy intake. The WHO defines “free sugars” as sugars added to foods and beverages by the manufacturer, cook, or consumer, and sugars naturally present in honey, syrups, fruit juices,\textsuperscript{78} and fruit juice concentrates (WHO 2015). My dietary assessment data indicate that villagers in Gyepo consume an average of 38 grams of sugar per day, while villagers in Kale consume an average of 26 grams per day. In addition to there being differences in sugar consumption by proximity to road, there are also differences in sugar consumption by socioeconomic status in Gyepo; while villagers from households with high SES

\textsuperscript{77} High-fructose corn syrup (HFCS) is composed of equal parts of fructose and equal parts of glucose. In the years after the Great Depression, scientists discovered that processing and refining corn could turn it into a sugar alternative (HFCS). Although producers argue that there is no difference on a molecular level from regular sugar, it does not impact the body the same way as table sugar. Consumption of HFCS causes significant weight gain, especially in the abdomen, and a rise in circulating blood fats (triglycerides) (Malik et al. 2006).

\textsuperscript{78} Unfortunately, fruit juices do not have as many health benefits as one might assume. When an individual consumes fruit juice, the juice is squeezed, giving the consumer all of the juice but very little of the fiber or nutrients that get left behind in the process. While I was conducting my fieldwork, there was talk about villagers at lower elevation making jam out of their fruit as a way to diversify their diets and as a potential business opportunity. Although selling this product may have positive economic impacts, when fruits become altered (into juice or jam for example), much of the fiber and nutrients get lost.
consume an average of 60 grams of sugar daily, villagers from household with low SES consume an average of 30 grams of sugar daily.\textsuperscript{79}

By comparison, according to the USDA, the average intake of sugar per person per day in 2000 in the United States was 128 grams. Although villagers in Kale and Gyepo are consuming much less sugar than the average American, it is important to recognize that with the arrival of the road comes an increased number of foods with a high added sugar content. Without proper education as to the negative health implications associated with these foods, Humli villagers will be at a higher risk of obesity and chronic disease associated with consuming these foods. An increase in sugar consumption is also an indication that individuals are progressing into Pattern Four of the nutrition transition. Because Gyepo villagers with high SES are consuming, on average, a higher amount of sugar than villagers in Kale or villagers in Gyepo with low SES, this indicates that both “proximity to road” and SES play a significant part in the speed of progression through the nutrition transition in terms of sugar intake. The data indicate that there was no difference in sugar consumption by gender.

Interestingly, my data also suggest that while men tend to ascribe prestige to foodstuffs such as Chinese liquor and sugar-based items, most women much prefer to eat their locally produced foods and drink either butter tea and/or local barley beer or liquor. The primary response among women as to why they do not drink Chinese liquor and/or consume foods such as ramen noodles, candy, and soda pop, is that they simply do not enjoy the taste. According to one 46-year-old woman in Kale village:

I do not like eating that (market-purchased candy, chocolate). I do not like the taste, and it does not help with hunger. I get much more energy from our foods--tsampa, kora, alu, (potato) sisnu (nettle). Those are the foods I know and like. If I eat those, I can go to the fields and work, and I am not hungry for many hours.

This woman’s response indicates that eating the locally produced food provides her with more energy and sustenance, which is most likely because local foods have a higher nutrient density. Interview data indicate that the ascription of value to the market-purchased foods is

\textsuperscript{79} To calculate this statistic, I put the households in Gyepo and Kale into two categories--high SES and low SES. I then compared the daily sugar intake between those two groups across villages.
gendered, with fewer women ascribing value or prestige to the market-purchased foods than men. Data illustrate that livelihood designation is one reason males are ascribing more prestige to these foods than women; because men are often away from their villages engaging in trade and business transactions, they have more frequent encounters with market-purchased foods and, therefore, may be associating them with travel, business, and the “modern” lifestyle.

7.6 Dietary Assessment of Children

During my research I did not systematically assess the diets of children. However, after having spent numerous months in both Gyepo and Kale village, I did inquire about weaning practices as well as witness many food consumption behaviors of children.

According to my interviews, weaning practices begin anywhere between 1.5 years to 3 years of age, depending on whether the mother is pregnant with another child. In both Gyepo and Kale villages, the first food a baby is introduced to is tsampa (a porridge-like food made from barley). Mothers typically chew up the tsampa in their mouths (they also do this to ensure it is cool enough for the baby to eat), and then they feed their babies this “pre-tested” food. According to interviews, it is typical for babies to first solely breastfeed, to then be introduced just tsampa (while continuing to breastfeed) for a few months, and then to be introduced to all other available foods.

According to mothers in both villages, after the introduction of tsampa, there is no particular order in which other foods are introduced. Parents will introduce all grains, available vegetables and meat, and local butter tea simultaneously to children after a few months of them solely being fed tsampa. For example, one evening I was eating dinner with a family in Gyepo at their home when their four-year-old son reached for the chili pepper-based sauce and sprinkled some on his yak-meat dumpling. He took a bite, and finished it off with a few large gulps of yak-butter tea. Young children most often consume the same types of foods that adult villagers consume.

80 It is typical that the last-born child is breastfed the longest. Often during my fieldwork, mothers would indicate that they wished that they could have breastfed some of their children longer, but because they had another baby, they had no choice but to wean some of their children early.
81 Tsampa, made from local-barley, is a very nutritious food for babies.
Although the benefit of these weaning practices is that children are introduced to a wide variety of foods early, in some cases, the types of foods being fed to young children in Gyepo and Kale is problematic. For example, there are many market-purchased, processed foods that are high in sugar that are also being fed to children at a young age. One example of this is ramen noodles. According to villagers, before they had easy access to the market in China, it was difficult for mothers to prepare a quick snack for their children, particularly when the children were hungry but the mothers were extremely busy with household tasks. Now, mothers look to ramen noodles (instant noodles) to curb the hunger of their children and hold them over until the mothers have time to cook a proper meal. The following photograph (Figure 7.10) is a typical scene in Humla District–young children being fed ramen noodles as a midday snack. Children enjoy the taste of ramen noodles so much that they would sometimes demand their mothers provide ramen noodles instead of a traditional kora (bitter buckwheat pancake) snack.

Figure 7.10: Children eating ramen noodles for a snack
According to local discourse, in many cases these market-purchased unhealthy foods were being “saved” for the children. For example, often while I was conducting my FFQ and inquiring about the consumption of drinks such as “coffee” or “energy drinks,” mothers would say that that while they themselves do not consume these drinks (most often because they do not like the taste), they “save” them for their children. Their use of the verb “save” indicates that they hold these foods in high regard. While in the field, I witnessed numerous children drinking coffee, energy drinks, or “sugar water” (made by mothers stirring a tablespoon of sugar into water) often times in between breastfeeding. Most parents have not been educated as to the negative repercussions of these foods and beverages and often believe they are doing something good for their child by providing them with these new, “modern” foods.

In Chapter Three, I discussed how children learn eating habits through the process of enculturation. While for those children who are currently in their teenage years this process means consuming locally produced snacks such as toasted barley seeds (a local snack I often compared to popcorn), the younger generation (children who are 12 and younger) are becoming used to eating ramen noodles in addition to foods high in sugar such as soda, energy drinks, hard candy, and chocolate. They have come to expect these foods, enjoy the taste of these foods, and will most likely grow up to continue to do so unless they are educated about the negative repercussions of a diet that includes a high proportion of these foods.

In the aforementioned section, I discussed the dietary patterns of villagers in Gyepo and Kale. Although diet is only one aspect of health, it is crucial to identify and understand dietary nutritional deficiencies because diet change is something that humans have the ability to control (given that certain foods are available at a manageable price). By identifying what nutrients and vitamins villagers are lacking, educational programs can assist in ensuring that villagers are making informed decisions about their food consumption, especially in the wake of the new road and all of the new types of food that are arriving with it.

In this next section, I present my anthropometric data in order to assess the nutritional status of villagers.
7.7 Nutritional Status Assessment

To measure villagers’ nutritional status, I took a variety of anthropometric measurements (see Chapter Four for details). Although these data provide a general sense of villagers’ nutritional status, I am not solely attributing these outcomes to villagers’ dietary patterns. Many other health issues that an individual may be suffering from (i.e. tuberculosis, thyroid problems, and diarrheal and other waterborne diseases) could result in abnormal BMI, arm circumference, and/or skinfold levels.

7.7.1 Nutritional Status of Adults

To assess the nutritional status of adults in both villages, I calculated the Body Mass Index (BMI) for each individual. Although I use the recommended BMI cut-off points set forth by the WHO\(^{82}\), it is notable that, based on a recent WHO expert consultation, the proportion of Asian people with a high risk of type-two diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cutoff point for overweight (BMI \(\geq 25\)) (WHO, 2004). Given this information, is it especially important to recognize the risk of chronic disease for those villagers who are deemed “overweight” in this study.\(^{83}\) In the following graph (Figure 7.11) I present nutritional status data (based on BMI levels) for adults (ages \(\geq 18\)) in both villages.

\(^{82}\) For quick reference: Underweight = BMI \(\leq 15\), Normal = BMI between 16-25, Overweight = BMI \(\geq 25\).

\(^{83}\) Although this was mentioned in Chapter Four, I wanted to clarify that the BMI as a measurement for adiposity does not take into account the muscle to fat composition of the individual. This said, if an individual’s BMI is higher because he/she has high muscle content, this could actually decrease their risk of chronic disease because they most likely have better heart health and a quicker metabolism.
The graph is organized by percentage of “normal” weight individuals (BMI between 16-25), where the farthest left bar depicts the village, season, and gender group that has the highest percentage of “normal” weight individuals, and the farthest right bar shows the group that has the lowest percentage of “normal” weight individuals. When the percentage of individuals with “normal” weight decreases, the percentage of “underweight” and/or “overweight” individuals increases.

The fact that most villagers in both Gyepo and Kale are “normal” weight (anywhere from 74 percent to 89 percent of the total population in each category) indicates that, in general, villagers’ health (in terms of their nutritional status) is good. Notable, however, is that there are nutritional differences between villages, seasons, and genders, and that the prevalence of “overweight” individuals is actually higher than “underweight” individuals. In the following subsections I explore in further detail this variability in measured nutritional status.
7.7.2 Underweight

There are two groups in the study sample where > 5 percent of the total population was “underweight.” The first is the men during the harvest season (fall) in Kale. Eleven percent of this group was “underweight.” Interview data suggest that the presence of “underweight” amongst this group is because they are expending many more calories during the fall in comparison to the men in Gyepo and the women in both villages. Reasons for this are that Kale men are not only engaged in agricultural tasks, they also spend weeks at a time with the yaks at the high alpine grazing camp, and travel far distances on foot to acquire foodstuffs and household goods from either the temporary market and/or the Chinese market. For the men in Kale, all of this labor is done without the use of trucks for transportation and typically over very steep, arduous mountain passes (due to the topography of the landscape between Kale and the road).

Although men in Gyepo are also engaged in these tasks, two circumstances are different: 1.) The men in Gyepo do not have to expend nearly as many calories obtaining food from China as the men from Kale (as they typically travel by truck to reach the market) and, 2.) Because the topography in Gyepo is flat, men do not typically have to exert as much energy taking their cattle to higher pastures to graze.

In comparison to the 11 percent of men in Kale in the fall who are “underweight,” only 5 percent of women are “underweight.” Although women also work an average 13-hour workday, they typically engage in tasks that allow them to sleep at home at night (in comparison to the men who are often camping in the high-alpine pastures or are on the road to China). The simple fact that the labor allocated to women keeps them at the village during the nighttime indicates that they are more likely to consume an adequate amount of calories per day. Women at home can control their food intake and have a higher chance of eating until they are full than the men who are away from home (when their husbands are away, women have the opportunity to eat more because they are not meal sharing with as many people). In comparison, men in the high-alpine pastures are rationing the food that they bring with them and are reliant on other families to cook for them when they are on the road.

84 By “group” I mean category of villagers (with “village,” “season,” and “gender” being grouping variables). I parsed out the villagers into eight different groups (see x-axis of Figure 10 for all groupings).
The second of these groups is the women during the harvest season (fall) in Gyepo. Six percent of this group was “underweight.” Interview data suggest that the prevalence of “underweight” among this group of women is because many men are becoming more engaged with road-related tasks in Gyepo in the fall, leaving more of the agriculture- and cattle-related tasks to the women. While both men and women are working in Gyepo, the amount of labor-intensive work is decreasing for men and simultaneously increasing for women. This shift in labor and the resulting impact on nutritional status is illustrated in the data; while 6 percent of women are “underweight” in the fall in Gyepo, 16 percent of men are simultaneously “overweight” (it is interesting to note that in Kale only 4 percent are “overweight”). The issue of being “overweight,” although on the other side of the nutrition spectrum, is also accompanied with a variety of health concerns, primarily the onset of risk for type-two diabetes, cardiovascular disease, and increased mortality (Whitney and Rolfes 2013).

Data from famines suggest that an accelerated loss of peripheral tissue during acute undernutrition has a relatively greater depressing effect on MUAC than upon BMI. It also suggests that the relationship between MUAC and BMI is not constant during acute undernutrition (Dasgupta et al. 2010). For this reason, I cross-referenced individuals’ BMI and MUAC data to ensure that I was not overlooking any instances of acute undernutrition. The only group whose undernutrition was reflected in the MUAC data is the women in Gyepo; in fall and spring, these women had MUAC scores between 160 and 185, which indicates that they are suffering from moderate acute malnutrition. No other individuals who were not already captured by the BMI data had low MUAC scores. Interestingly, there were also no men who showed MUAC scores of concern. The fact that some men (particularly those in the fall in Kale) showed signs of undernutrition via the BMI data but not via the MUAC data could be an indication that muscle is present (thus increasing the MUAC), and these men are still underweight according to their BMI measurements.

7.7.3 Overweight

The three groups where the prevalence of “overweight” is the highest are the men in the spring in Gyepo (23 percent), the women in the spring in Gyepo (22 percent), and the men in the fall in Gyepo (16 percent). The anthropometric data illustrate that the combination of a more
sedentary lifestyle and the arrival of enriched, processed foods via the new road is already manifesting itself in a population that is more “overweight.” Referring back to the dietary assessment data, villagers in Gyepo consume a higher amount of alcohol, in addition to more processed grains and other added sugars. All of these foods may contribute to the higher percentage of villagers that are “overweight” in the road-village.

7.7.4 Nutritional Status of Children

I checked for bilateral oedema in all children 0-6 months of age in Kale and Gyepo (oedema is the retention of water in the tissues of the body, a sign of malnutrition in babies, which I discuss in detail in Chapter Four), and did not find any evidence of malnutrition (which includes kwashiorkor, or protein malnutrition). This test, coupled with the fact that all clinical signs (i.e. visible wasting, too weak to suckle) looked positive, led me to conclude that there were no instances of malnutrition among this age group of children in either village.

Based on the weight and height measurements that were taken from all of the children (ages six-60 months) in both villages, I can confirm that more children in Kale are experiencing undernutrition than in Gyepo (See Table 7.14):

85 Since I do not have baseline anthropometric data to compare these measurements to, it is impossible to state with 100 percent certainty that the fact that more villagers (both men and women) in Gyepo are “overweight” than in the non-road village is entirely caused by the arrival of the new road and the increased access to the Chinese market. However, based on a combination of these anthropometric results, the food frequency questionnaire data, interview responses, and personal observation, I am relatively certain the new market access, and the accompanying sedentary lifestyle, is the primary driver behind this nutritional trend toward a higher percentage of villagers being overweight.
86 Although being “overweight” is not a direct predictor of diet-related non-communicable diseases, research indicates that overweight individuals have a much higher likelihood of developing such diseases (Amuna and Zotor 2008, Riosmena et al. 2012). Because current research shows that Nepal continues to suffer from infectious disease (Basnyat et al. 2015, Poudel 2003), this could be evidence that a “double burden of disease” is occurring (as introduced in Chapter Three), particularly in Gyepo (as this village has higher instances of “overweight” individuals). These anthropometric results provide a framework for more research to be carried out in this region pertaining to causes of morbidity, and whether Upper Humla is suffering from a “double burden of disease.”
87 All children 6-60 months live in their natal villages full time. Older children are often away at boarding school, and, therefore, their anthropometric measurements may skew the dietary patterns of the villages, because they are consuming most of their food at school and just coming back to their villages for holidays and winter break. For this reason, I have limited the inclusion of my anthropometric data to children six-60 month of age in this section.
Table 7.14: Children (ages 6-60 months) malnutrition levels

<table>
<thead>
<tr>
<th>Weight-for-Height</th>
<th>Z-Score</th>
<th>Kale (n=27)</th>
<th>Gyepo (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0 to -2</td>
<td>78%</td>
<td>88%</td>
</tr>
<tr>
<td>Moderately Malnourished</td>
<td>-2 to -3</td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>Severely Malnourished</td>
<td>≥ -3</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Twenty-two percent of the children (six children) in Kale are “moderately malnourished,” compared to 8 percent in Gyepo (two children). In Kale, 33 percent of moderately malnourished children come from poor households, while the remaining 66 percent come from households with average SES levels. In Gyepo, one of the moderately malnourished children comes from a poor household, and the other comes from a household with an average SES level. The 4 percent of children ages 6-60 months in Gyepo who are “severely malnourished” is actually one child, given that the N is 25. This child is from a household with an average SES level. All children from wealthy households in both Kale and Gyepo are experiencing “normal” nutrition levels.

Although I did not collect dietary profile data for children of this age group, from participant observation and interview data I can confirm that children in Gyepo of this age group have access to more calcium and animal-sourced protein (via easy access to dairy products in the fall and eggs throughout the year) than the children in Kale, once the children are of solid food consuming age.

As previously mentioned, in both villages the first food children are introduced to is barley porridge (tsampa). Often, mothers will mix the porridge with milk, which is more available in Gyepo than Kale during the fall months because the cattle graze at a closer distance to the village. Once the children get a little older, parents and caregivers introduce all other foods available almost immediately and simultaneously. Because eggs are more readily available in Gyepo, I witnessed many young children eating hard-boiled eggs. Although there are most certainly other elements at play pertaining to the young children’s malnutrition levels, based on my observation and nutrition analysis, the higher levels of calcium and protein are most certainly aiding in the health of the Gyepo children.

7.8 Conclusion

There is no doubt that the new road in Humla District has provided villagers in both villages with access to a higher variety of processed foods, which are less nutrient-dense and
contain more additives than the traditional foods in Humla District. However, the dietary assessment results presented provide evidence that numerous other factors, such as crop growing ability (i.e. mustard in Gyepo and barley in Kale) and topography (which dictates the ease of obtaining dairy) play a major role in the nutrition content of diets.

In general, the dietary patterns in Gyepo are beginning to reflect those of an average modern-industrial diet: a lower amount of fiber from grains (indicating a higher level of processed grain consumption), a higher level of high-proof alcohol consumption, and an increase in processed, packaged food consumption (high in both additives and sugars). All of these markers are indicators that Gyepo villagers may be progressing to Pattern Four of the nutrition transition, which would indicate that they are at a higher risk for developing DR-NCD (diet-related non-communicable diseases). However, villagers in Gyepo are luckily to have a local source of nutrient-rich oil (mustard), in addition to the animal-sourced protein that is easier to access (more consistent dairy intake and the availability of eggs year round), which lowers the risk for protein-energy malnutrition.

In contrast, the dietary patterns in Kale are more reflective of the traditional Humli diet. Kale villagers consume a large amount of whole grains, which provide high levels of fiber. However, they also lack high quality protein because dairy is difficult to continuously access, and animal-sourced protein (eggs) is not available. Additionally, Kale villagers have been using almost 100 percent vegetable oil from China for cooking, which has lasting negative nutritional impacts.

The dietary assessment data indicate that there are two stories occurring simultaneously. Those in Gyepo, who have more dietary opportunities due to the location and topography of their village, would benefit from limiting their consumption of the market-purchased nutrient-poor foods (especially high-proof alcohol and packaged foods), even though they are readily available. Those in Kale, who have less dietary opportunities, would benefit from utilizing the market in more nutrient-conscious ways, perhaps by prioritizing their consumption of animal-sourced protein (eggs) and non-processed oils.

The issue of ascribing prestige to market-purchased foods also seems to play a role in dietary habits. Men, who tend to ascribe more prestige to both Chinese alcohol and foods high in sugar, will more likely have the desire to consume these foods than women, who tend to prefer consuming their traditional, locally produced foods due to taste preferences and the fact that the
local foods provide them with more energy. Additionally, since, for example, sugar intake is directly correlated to high SES, if a household improves their SES, they may be at risk for high daily sugar consumption as they may use a portion of their disposable income on high-valued foods.

Based on the anthropometric data, I reject the null hypothesis and confirm that there is a difference in the nutritional status of villagers by proximity to the road (with villagers in Gyepo having a higher proportion of villagers who are either underweight or overweight). However, the dietary analysis paints a more holistic picture of the current nutrition situation in the two villages. Based on all of the data presented in this chapter, I would argue that Gyepo has better access to consistent dairy (which provides calcium), a consistent animal protein source (eggs), and a healthy oil for daily consumption. As a result, children are better off, nutritionally speaking, growing up in this village (this is also reflected in the anthropometric data, which show a higher incidence of malnutrition in Kale among children). However, the risk of these children falling into the habit of consuming a high-sugar, high-processed food diet when they are older is higher because their enculturation process involves consuming market-purchased foods from a young age.

During adult life, it appears more harmful to live in Gyepo due to the increased availability of nutrient-void processed foods that contain high-fructose corn syrup. High-proof alcohol is also much more accessible. No doubt there will be villagers who do not prefer these foods and/or cannot afford them, but it has already become apparent these “road foods” are playing a role in the advent of “overweightness” in Gyepo.

Based on the dietary assessment, interviews, and time spent in the field assessing what food items are available to Humli villagers; I make the following dietary recommendations, which are slightly different for each village:

**7.9 Dietary Recommendations**

7.9.1 Dietary Recommendations For Villagers in Gyepo

- Continue cooking with local mustard oil
- Continue consuming eggs
- Continue consuming chilies (numerous vitamin and mineral benefits)
- Consume local grains over market-purchased grains when possible
• Consider trading with non-road villagers for barley instead of purchasing it in China
• Limit Chinese liquor consumption
• Limit sugar consumption (sugary beverages, candy, packaged snacks)
• Increase production of pumpkins in greenhouses (for vitamin A specifically)
• Consume all dried apricots
• Consume the skin of the potato (1/2 of the vitamins/minerals are lost if skin is discarded)
• Consume at least 64 ounces of water per day

7.9.2 Dietary Recommendations For Villagers in Kale
• Continue consuming chilies (numerous vitamin and mineral benefits)
• Use all local mustard oil for cooking
• Consider trading with road villagers for mustard instead of purchasing vegetable oil in China
• Consume local grains over market-purchased grains when possible
• Consider raising chickens (and eating eggs) to increase essential amino acid consumption
• Consume all dried apricots
• Increase production of pumpkins in greenhouses (for vitamin A specifically)
• Consume the skin of the potato (1/2 of the vitamins/minerals are lost if skin is discarded)
• Consume at least 64 ounces of water per day

Implementing some of these dietary recommendations, however, may involve suggesting changes that are contrary to traditional cultural beliefs. For example, suggesting that villagers “consume all dried apricots” would involve a substantial cultural shift because this food is traditionally given to animals. Other recommendations, such as “continue consuming chilies” may be an easier recommendation to implement because it simply involves continuation of a local dietary practice. Along the same lines, if local NGOs provided more pumpkin seeds to villagers with an explanation why consuming pumpkin is beneficial for health, this suggestion could be implemented without disturbing local cultural practices.

By providing these dietary recommendations to locally run NGOs, it is my aim that these institutions use these recommendations as they see fit, without altering the cultural practices of villagers but as educational guidelines as to how villagers could make more informed food consumption choices.
Chapter 8
The Attainment of Well-Being Through Religion, Family, and...Party-time?

8.1 Introduction

In the previous chapter, I assessed the nutritional profile of villagers in Gyepo and Kale, and provided objective, anthropometric data regarding villagers’ nutritional status. Based on the data, I provided dietary recommendations centered on what types of food are available to villages. As development in the form of infrastructure and roads increases throughout the Himalaya, as is currently the case in Upper Humla District, it becomes important to understand how these projects influence how villagers feel about their own health. Is the arrival of the new road bringing contentment or has it become a catalyst for dissatisfaction? I use villagers’ subjective well-being as a proxy for their subjective health, and assess whether well-being directly correlates to their proximity to the road, as well as whether a level of disparity in well-being can be discerned throughout and between the villages.

I hypothesized that, due to a high amount of road-induced stress and intra-village competition arising from limited road-related opportunities, villagers in Gyepo would experience a higher level of subjective well-being disparity than villagers who live far away from the road (in Kale).

H1 = Villagers living in close proximity to the road (in the case village) will experience a higher level of subjective well-being disparity in comparison to the villagers who live away from the road (in the control village) because they are experiencing higher levels of competition as a result of limited road-related opportunities.

Ho = There is no difference in the subjective well-being disparity levels by proximity to the road.

To quantify villagers’ subjective well-being and test this hypothesis, I conducted cultural domain analysis (see Chapter Four for more details on how I elicited information about what constitutes well-being in each village and how I obtained a quantitative measure of well-being).
This analysis involved multiple steps, the first of which was to obtain two separate subjective well-being lists (one for each field site village) from key informants in both villages. Not only do these lists provide an emic understanding of how villagers conceptualize subjective well-being, they also provide insight into the relative importance of these items, as well as information as to how many households possess these items.

8.2 Defining Subjective Well-Being

The following tables (Tables 8.1 and 8.2) present the subjective well-being lists that key informants created. These lists illustrate that while some items and/or characteristics are important to well-being in both villages (i.e. “time for religious practice,” “calm and positive thoughts,” and “have a HH where all members get along”), others are unique to one. Teasing out the similarities and differences of these lists will aid in a better overall understanding that the way villagers conceptualize subjective well-being is very different from village to village. The following table (Table 8.1) illustrates the well-being list for Kale.\(^8\)

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\(^8\) I have attached a translated version (English and the local Tibetan dialect) of Kale’s subjective well-being list in the appendix (A8.1).
<table>
<thead>
<tr>
<th>Rank*</th>
<th>Well-Being Indicators</th>
<th>Percent Possessing Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have access to education</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Are kind to others</td>
<td>95</td>
</tr>
<tr>
<td>2</td>
<td>Have family members who get along</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Are in good health</td>
<td>77</td>
</tr>
<tr>
<td>2</td>
<td>Have a family</td>
<td>95</td>
</tr>
<tr>
<td>3</td>
<td>Have time for religious practice</td>
<td>85</td>
</tr>
<tr>
<td>3</td>
<td>Have children who can 'stand on their own two feet'</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>Have opportunity to pray/live above village when older</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>Have healthy children</td>
<td>82</td>
</tr>
<tr>
<td>6</td>
<td>Have a successful business</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>Have enough food for the household</td>
<td>92</td>
</tr>
<tr>
<td>7</td>
<td>Have calm thoughts, and a calm mind</td>
<td>77</td>
</tr>
<tr>
<td>7</td>
<td>Have access to transportation facilities</td>
<td>85</td>
</tr>
<tr>
<td>8</td>
<td>Are financially stable</td>
<td>21</td>
</tr>
<tr>
<td>8</td>
<td>Do not have any debts</td>
<td>51</td>
</tr>
<tr>
<td>9</td>
<td>Have the ability to take things lightly</td>
<td>95</td>
</tr>
<tr>
<td>9</td>
<td>Are able to travel independently</td>
<td>72</td>
</tr>
</tbody>
</table>

*If the rank is the same, it is an indication that villagers ranked the well-being indicators as possessing equal amount of value.

Kale’s well-being list can be categorized into the following groups: Education, Buddhist values, health and finance-related items, and the status of children. “Having access to education” is the most important factor in the achievement of well-being in Kale. Although education factors very highly in terms of villagers’ well-being level, it is interesting to note that it was not included in the conceptualization of SES in either village (see Chapter Five). This indicates that although villagers do not view education as having a direct link to their households’ SES, they do believe it to be a very valuable component of life satisfaction. According to the data, however, only 13 percent of households in Kale have access to education.

Numerous items on the list, including “are kind to others,” “have calm thoughts, and a calm mind,” and “have the ability to take things lightly,” are in fact individual traits that represent foundational aspects of the Buddhist philosophy-compassion, kindness, and thoughtfulness. Notably, not all key informants were elderly villagers who had their entire lives to recognize that facets of the human condition such as mental clarity and calmness are

89 These terms are the English translations of Buddhist concepts and values that were used by the Dalai Lama in his text, *The Art of Happiness* (XIV Dalai Lama and Cutler 2003).
important indicators of well-being—many of them were young men and women in their mid-20s. In many instances in the West, the elderly are relied upon to provide insight into how well-being can be attained through attributes such as compassion and kindness. In Kale, this concept is recognized from a very young age, as can be seen by the fact that most individuals possess the aforementioned qualities, which are both foundational to the Buddhist moral code as well as to well-being in Kale (95 percent, 77 percent, and 95 percent respectively).

Another notable feature of this list is that two health-related items are included: “are in good health,” and “have healthy children,” and that most households (77 percent and 82 percent respectively) possess these attributes. This indicates that a high percentage of households feel as though their health, and the health of their families, is good.

In thinking about how this list reflects the fact that Kale is far away from the road, it is interesting to note that while “having a successful business” is ranked sixth in terms of importance, only 23 percent of households do, in fact, possess this item. At the same time, only 21 percent of households are in fact “financially stable,” which is the eighth most important item on the list in terms of achieving happiness in the non-road village. Although villagers mentioned “not having any debts” as the eighth most-important item on their list, only 51 percent of households are debt-free. This information indicates that while most households seem to be physically healthy, most face some sort of financial difficulty. Lack of business opportunities away from the road seems to be further exacerbating this problem.

Because Kale is quite far from both the road and the main footpath that runs through Upper Humla District, it makes sense that two transportation-related items would be on the list: “have access to transportation facilities” and “are able to travel independently.” Most households (85 percent and 72 percent respectively) possess these items/attributes. In this case, “access to transportation” most often means that the family has access to a dzopa (a yak-cow crossbreed) or a horse, the two animals most commonly used for transportation. Given that 77 percent of households are healthy, it makes sense that 72 percent are able to travel independently (which again, indicates that individuals have the strength to walk far distances).

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90 After each of the key informants in Kale ranked the items on their villages’ well-being list, I aggregated their rankings. Some items shared the same average value after I aggregated the lists; for example, “are financially stable” and “do not having any debts” were tied as the eighth most important item/attribute on the list. For this reason, they share this rank.
The final point I will mention about Kale’s well-being list is that people cited the health and well-being of their children as being very important to the overall well-being of an adult individual. “Have children who can stand on their own two feet” (which villagers discussed more in terms of financial independence and of housing)\(^91\) was ranked third, and “have healthy children” was ranked fifth. Although 82 percent of households indicated that they have healthy children, only 23 percent of households indicated that their children could “stand on their own two feet,” which could be a reflection of the limited opportunities for young people, especially those who are uneducated in the village.

The following photograph (Figure 8.1) is of a mother with three of her children. The daughter on the left has returned to her natal village for a short while to visit the family–she typically returns home every four to five years from boarding school in India. The daughter second-from-left is married and lives with her husband’s family in the next village; she often comes home to visit her mother because she lives only one day’s walk away (every year, she comes home to help with the harvest, which in turn, increases the human capital of the household). The third daughter, on the far-right, lives at home with her mother helping with the fields, cattle, and household chores. Often throughout my fieldwork, this mother would tell me how luckily she is to have children who can “stand on their own two feet,” but come home to visit her often.

\(^{91}\) If daughters were married off, they were considered to be “standing on their own two feet”, as the parents generally did not have to worry about them as much. Also, if children were running a business, they were considered to be “standing on their own two feet” as well. In general, villagers expressed these attributes less in terms of the biological and/or mental health of their child, and more in terms of their independence, both financially and living independently.
Figure 8.1: Having healthy, independent children brings well-being: Another interesting aspect of this photograph is the difference in appearance (particularly the clothing styles) of all three daughters. The daughter on the left, who is typically in boarding school in India, is dressed in “modern fashion,” while the daughter to her right (the one who is married and lives in the next village), is dressed in typical Tibetan dress. The third daughter, the one who lives at home, is dressed in very functional clothing as she typically works in the fields.

To examine how the new road is influencing villagers sense of what items and/or characteristics are important for their well-being, it is important to compare both well-being lists and identify which indicators are unique to Gyepo. The following table (Table 8.2) illustrates the variables that villagers in Gyepo listed as important and shows how many households possess each attribute: 92

92 I have attached a translated version (English and the local Tibetan dialect) of Gyepo’s subjective well-being list in the appendix (A8.2).
Table 8.2: Gyepo well-being indicators by rank & percent of HHs possessing attribute

<table>
<thead>
<tr>
<th>Rank*</th>
<th>Well-Being Indicators</th>
<th>Percent Possessing Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time for religious practice</td>
<td>76</td>
</tr>
<tr>
<td>2</td>
<td>Have kind and positive thoughts</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>Savings</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Have household where all members cooperate</td>
<td>98</td>
</tr>
<tr>
<td>3</td>
<td>Are friendly with all people</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Have access to quality family time</td>
<td>91</td>
</tr>
<tr>
<td>5</td>
<td>Have the chance to live with family members</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>Are able to avoid quarrels</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>Have a healthy economy</td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>Are not greedy; content with what you have</td>
<td>54</td>
</tr>
<tr>
<td>8</td>
<td>Have time for leisure “party time” with friends</td>
<td>91</td>
</tr>
<tr>
<td>8</td>
<td>Able to have “tasty” foods</td>
<td>54</td>
</tr>
</tbody>
</table>

*If the rank is the same, it is an indication that villagers ranked the well-being indicators as possessing equal amount of value.

The well-being list in Gyepo can be categorized into the following groups: Buddhist values, family-oriented items, luxury items, and finance-related attributes. In Gyepo, the two most important items/attributes for well-being achievement are “time for religious practice” and “have kind and positive thoughts,” both of which reflect Buddhist values and are also mentioned as important in Kale. During a discussion on religious practice in Gyepo village, a man who was about 70 years old said:

I am lucky enough to live above the village and spend my days praying. Others are not so lucky. They have to stay in their homes and help their children with the grandchildren. I am happy because I can spend my days praying, which I have worked my life to be able to do. It is calm, and I don’t have to worry about much things. Right now I am here (at his home in the village) because my daughter went to Simikot for a health checkup, and so I am responsible for the children.93

93 All Buddhist villages in Upper Humla have houses above the village (at a slightly higher elevation than the village on the same hillside) where people can go to live and pray when they are older. The elderly typically spend months at a time in these houses, and their families bring them food and tea every few days. However, it does tend to be those families who have a higher level of human capital level (and do not need the elderly to, for example, watch the children from time to time) who can afford to have their parents or grandparents live above the village in a religious house.
Another similarity between the two well-being lists is that family-oriented items are associated with well-being achievement: “have a household where all members cooperate,” “have access to quality family time,” and “have the chance to live with family members.” Notably, most villagers (98 percent, 91 percent, and 91 percent respectively) have access to these items/attributes, which indicates that family health is strong even in the presence of the new road.

“Are able to avoid quarrels,” however, is an item unique to Gyepo; the fact that villagers placed it as sixth in terms of importance to well-being achievement is also reflected in the interview data, which suggest that increased road-related competition (because of limited space in the market for businesses such as restaurants and hotels) has spurred some disagreements among households in Gyepo. According to the data, only 80 percent of households are able to avoid these types of issues, which means that the other 20 percent of households are in some sort of intra-household conflict. It must be noted however, that this list does not account for the fact that this quarreling may have existed prior to the road. The fact that the interview data also suggest that quarreling became more prominent after the roads’ arrival does help to confirm that the presence of this particular well-being indicator is both unique to Gyepo and a negative consequence of the road. It is also important to note that while 100 percent of villagers indicated that they “are friendly with all people,” they still mentioned that they have business- and/or market-related quarrels.

Another trend in Gyepo is the addition of more “luxury items” to the well-being list, such as “have time for leisure ‘party time’ with friends” and be “able to have tasty foods.” Although these items ranked the lowest, key informants listed them as being important to well-being. In contrast to Kale, where most items were representative of the acquisition of very basic needs, villagers in Gyepo have added comfort items to their well-being list.

As an example, most days in the springtime I witnessed male villagers in Gyepo playing dice. Men would frequently gather in the early afternoons and play dice while drinking local chang and Chinese liquor, and they would laugh and play until after the sun went down. Women, on the other hand, although they would frequent each others’ houses often for butter tea and/or local chang, would never play the dice game with the men. I found it interesting that not only was "party time" mentioned as an important facet of well-being in Gyepo, but I also saw
villagers (mostly in the winter and spring) take much more time out of their days for socializing (either in their homes or on the road in the restaurants) than I ever saw in Kale.

The inclusion of “luxury items” brings up the idea that, because households have access to more items and foods from China, they are continuing to want more. This “Keeping up with the Joneses” idea is reflected in the fact that “are not greedy, content with what you have” was included on the list. If villagers indicated that not being greedy was important to well-being achievement, it is evidence that some villagers (46 percent to be exact) are displaying attributes associated with greediness in Gyepo.

Lastly, two finance-related items were included on the well-being list in Gyepo: “savings” and “have a healthy economy.” Although these items are similar to the finance-related items on Kale’s well-being list, it is interesting to note that while Kale villagers placed “not having debts” (buu-lung mie pa) on their list,94 Gyepo villagers placed “savings” (ngultrang saak yoepa) on their list. This subtle difference indicates that villagers in Gyepo value having cash saved, perhaps because they realize “savings” translates into having capital that can potentially be used to start a road-related business. This difference indicates that in terms of financial gains, villagers in Gyepo are looking forward, while villagers in Kale are still, in a sense, content with breaking even or just simply “not having debts.” Notably however, only 21 percent of households in Gyepo managed to save money, and only 26 percent indicated “having a healthy (household) economy.”

The aforementioned lists provide an emic understanding of how villagers conceptualize the idea of well-being, as well as how this concept varies by proximity to the new road. To address my initial hypothesis, I now examine how villagers’ fare in terms of subjective well-being based on their acquisition of the variables previously mentioned in the well-being models.

8.3 Attainment of Subjective Well-Being

After working with key informants to construct the well-being lists and rank these items according to level of importance, I then asked nearly all individuals from both villages whether

94 The nature of debts in both Gyepo and Kale is worth mentioning, as debts can take on many forms. Not only can households have debts in the form of owing cash to another household or villagers, but debts can be in the form of labor (i.e. helping another household in their fields), or in the form of food (i.e. owing another household either ground flour if their mill was used or traded food if that was agreed upon).
they possessed each item and/or attribute on their list (see Chapter Four for more detail about how I used cultural domain analysis to quantify villagers’ subjective well-being). The following graph (Figure 8.2) illustrates the results of this well-being exercise on an aggregate village level, with maximum, minimum, and average well-being scores indicated for both villages. By examining the differences among these three metrics, village level subjective well-being can be compared.

![Graph showing subjective well-being percentages for Kale and Gyepo](image)

**Figure 8.2: Comparison of individual subjective well-being levels by village**

These results show that although two individuals in Gyepo have 100 percent well-being scores, most villagers’ scores in both villages are between 80 percent and 50 percent. The minimum score in Kale is also slightly lower than in Gyepo (40 percent and 47 percent, respectively).

95 I was not able to acquire well-being data from each adult in both villages for the following reasons: Many individuals had left the village for periods of time for work; some were outside the village for medical reasons, and, in a few cases, even though villagers were present in the village, I was unable to interview them because they had medical conditions (i.e. they were mute and/or deaf). I did, however, manage to at least interview one adult per household (in many cases I interviewed multiple household members) as to their well-being status.
There are two individuals in Gyepo who have a 100 percent well-being score. One of these individuals is a 22-year-old woman who lives in a household with 19 other individuals (the family is polygamous and therefore the household has more children than the average Humli home; additionally, the parents adopted four other children in the village who did not have any family to take care of them). During one of our conversations, she explained to me some of the reasons why she is so content with life:

My house has so many people! Sometimes I forget how many people. I have a newborn, and another child, and have much help with them. I never feel alone. We always have family to eat food with and to do jobs (household tasks, agricultural work) with. He (points to her adopted father) also has a restaurant business so there is always something to do, people coming through the village. We also have enough food, too. And sometimes when we don’t want to cook at the home, we eat at the restaurant with the guests; it’s sometimes easier.

Her response indicates that not only does she live in a household with a high level of human capital (I explain the relationship between human capital and well-being in more detail later in this chapter), but she lives in a household that also owns one of the three restaurant/hotels that operate directly on the road. The other individual from Gyepo who reported a well-being score of 100 percent is from a household that splits their time between Gyepo (in the winters) and Hilsa (the village right on the Nepal/China border on the Nepal side) during the summers. This family owns and operates a restaurant/hotel in Hilsa for villagers who are traveling to the market in China. These are two examples of how individuals who are able to capitalize on the road can achieve a heightened sense of subjective well-being.

In the following table (Table 8.3), I provide additional statistics (maximum, minimum, mean, range, and coefficient of variance) pertaining to individuals’ well-being levels.

---

96 Although polyandry is the traditional marriage form in the ethnic-Tibetan communities in Upper Humla, there are also some families that practice forms of polygamy. In the case I mention here, the family practices polygyny, when a man is married to more than one wife at a time. In recent years however, most families practice monogamy.
The mean well-being score is 7 percent higher in Gyepo than in Kale (74 percent and 67 percent, respectively). Although the range is larger in Gyepo than in Kale (53 and 45, respectively), this metric does not provide any indication of how dispersed villagers’ well-being scores are. Because of this, I rely on the coefficient of variance to test my initial hypothesis of whether there is a difference in the subjective well-being disparity levels by proximity to road.\footnote{The coefficient of variance = \frac{[standard deviation/mean]}, which, considering the well-being scores of Gyepo and Kale village have different means, is the appropriate statistic to use in determining which village has greater well-being variance.} The coefficient of variance is slightly higher in Kale than in Gyepo (0.182 and 0.180, respectively), suggesting that there is a slightly higher variance in the subjective well-being levels in Kale. However, considering that this difference is so minimal, I fail to reject my null hypothesis and conclude that there is in fact no significant difference in well-being disparity levels on a village level.

These disparity-related well-being conclusions are, however, at the village-level. In addition to addressing variance between villages, it is equally important to identify whether intra-village variability exists in terms of villagers’ subjective well-being. In the next section, I address intra-village variability by both identifying and explaining potential reasons why individuals from certain households have a higher sense of well-being than others.

### 8.4 Intra-Village Differences in Subjective Well-Being

I begin to identify some of the intra-village differences in subjective well-being by posing the simple question, “What does a person with a high sense of well-being have that a person with a low sense of well-being does not have?” To broadly answer this, I refer back to the individual responses to the well-being list questions. Based on what items/attributes villagers from both
categories (high well-being and low well-being) possess, I am able to make a few generalizations and broadly identify some differences between these two groups.

8.4.1 High Subjective Well-Being vs. Low Subjective Well-Being

The following table (Table 8.4) illustrates the primary difference between those villagers with high levels of well-being and those with low levels.

<table>
<thead>
<tr>
<th>Village</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gyepo (High Well-Being)</td>
<td>A few financial problems, but mostly have all items on the well-being list.</td>
</tr>
<tr>
<td>Gyepo (Low Well-Being)</td>
<td>No healthy household economy; no savings; are greedy; do not have positive thoughts.</td>
</tr>
<tr>
<td>Kale (High Well-Being)</td>
<td>A few financial problems, but mostly have all items on the well-being list.</td>
</tr>
<tr>
<td>Kale (Low Well-Being)</td>
<td>No education; have children that cannot support themselves; most do not have a successful business; not financially stable.</td>
</tr>
</tbody>
</table>

In Gyepo, all of the individuals who have a low sense of subjective well-being indicated having some type of barrier to economic success. Additionally, most villagers with lower well-being levels indicated that they were in fact greedy. Of those who reported being greedy, 71 percent also reported not having positive thoughts (this does not confirm a positive relationship between “greediness” and “not having positive thoughts,” but interview data illustrate that these variables were often related). Interview data suggest that feelings of greediness have come as a result of some individuals in Gyepo seeing what others in their village have obtained (in terms of material goods, financial stability, social capital, and future opportunities), and, consequently, feel at a relative disadvantage and wish that they could somehow access those items.

In Kale, those with lower subjective well-being levels seem to be plagued with a set of characteristics that are also less than optimal, such as not having an education and not having children who can support themselves, in addition to financial problems. Interestingly, much of the lack of well-being in Kale stems from there not being as many opportunities for advancement through education (nearly everyone who had a low well-being level in Kale said they did not have the opportunity for education, and that their children were still dependent on them). Notably, these items are also related, as my data suggest that if a child is educated, he/she will
have more access to more opportunities and possibly will have a higher likelihood of “being able to stand on his/her own two feet.”

To gain a deeper understanding of the intra-village variability of well-being levels, I tested various sociocultural and economic variables to examine whether any have a statistically significant relationship to subjective well-being. For those variables that do have such a relationship, I draw on data from interviews, focus groups, and ethnographic narratives to explain these relationships in this chapter.

8.5 Determinants of Subjective Well-Being

A central question is whether “proximity to road” is a strong determinant of each of the three health outcomes I am concerned with (food security, diet and nutrition, and subjective well-being). Although the well-being-related hypothesis was more concerned with well-being disparity levels between villages, I still aim to decipher which sociocultural and economic variables are strong determinants of subjective well-being. The following table (Table 8.5) provides a summary of the statistical tests that I conducted to determine which variables have a significant relationship to subjective well-being.

98 A few of those children in the villages who received a post-secondary education (i.e. in Simikot, Kathmandu, or India) returned to their home village. Of these children, nearly all of them that I met were employed in Humla District as a teacher in a local school (primary or secondary) or were working for a local NGO.
Table 8.5: Test results: potential determinants of household food security

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Type</th>
<th>Independent Variable</th>
<th>Type</th>
<th>Statistical Test</th>
<th>P Value</th>
<th>Significant Results?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Proximity to Road</td>
<td>Categorical (1=road village, 2=non-road village)</td>
<td>Independent T-test</td>
<td>.346</td>
<td>No</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Proximity to Road</td>
<td>Categorical (1=road village, 2=non-road village)</td>
<td>One-sided ANOVA</td>
<td>.101</td>
<td>No</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Socio-economic Status</td>
<td>Categorical (1=low, 2=average, 3=high)</td>
<td>One-sided ANOVA</td>
<td>.001</td>
<td>Yes*</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Human Capital</td>
<td>Categorical (1=low (1 person), 2=low/medium (2 people), 3=medium/high (3 people), 4=high (≥ 4 persons))</td>
<td>One-sided ANOVA</td>
<td>.042</td>
<td>Yes*</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Land Abandonment</td>
<td>Categorical (0=no, 1=yes)</td>
<td>Independent T-test</td>
<td>.428</td>
<td>No</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Female head-of-household</td>
<td>Categorical (0=no, 1=yes)</td>
<td>Independent T-test</td>
<td>.411</td>
<td>No</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Presence of family business</td>
<td>Categorical (0=no, 1=yes)</td>
<td>Independent T-test</td>
<td>.956</td>
<td>No</td>
</tr>
<tr>
<td>Well-Being</td>
<td>Interval/Continuous</td>
<td>Presence of successful greenhouse</td>
<td>Categorical (0=no, 1=yes)</td>
<td>Independent T-test</td>
<td>.250</td>
<td>No</td>
</tr>
</tbody>
</table>

* These results are statistically significant and will be discussed further in the chapter.

To test whether “proximity to road” is a statistically significant determinant of villagers’ subjective well-being, I conducted both an Independent T-test as well as a one-sided ANOVA, both of which did not yield significant results [p value = .346 and .101, respectively]. This suggests that the samples were drawn from populations with the same means.

In contrast, both socioeconomic status and human capital proved to have a statistically significant relationship with subjective well-being. In the following section, I present the statistical tests that illustrate this significance and explain the nuances of these relationships using the ethnographic data I obtained via participant observation, interviews, and focus groups.
8.5.1 The Relationship Between Social Stratification and Subjective Well-Being

Results of a one-way ANOVA verified that there is a significant relationship between social stratification (as measured by villagers’ SES levels\(^{99}\)) and villagers’ ability to attain high subjective well-being scores based on their villages’ well-being model, \(F(2,55) = 7.74, p = .001\). This suggests that the samples were not drawn from populations with the same means. To test which specific SES groups differed in their subjective well-being outcomes, I executed a Tukey Post Hoc test (Table 8.6)

Table 8.6: Post hoc test: Tukey HSD
SES Categories: 1 = poor, 2 = average, 3 = wealthy

<table>
<thead>
<tr>
<th>(I) SES</th>
<th>(J) SES</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>2.00</td>
<td>-10.47571</td>
<td>3.76214</td>
<td>.020</td>
<td>-19.5378 -1.4136</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.00</td>
<td>-20.92308</td>
<td>5.48918</td>
<td>.001</td>
<td>-34.1452 -7.7010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>1.00</td>
<td>10.47571</td>
<td>3.76214</td>
<td>.020</td>
<td>1.4136 19.5378</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.00</td>
<td>-10.44737</td>
<td>4.81592</td>
<td>.086</td>
<td>-22.0477 1.1530</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>1.00</td>
<td>20.92308</td>
<td>5.48918</td>
<td>.001</td>
<td>7.7010 34.1452</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>10.44737</td>
<td>4.81592</td>
<td>.086</td>
<td>-1.1530 22.0477</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Tukey post-hoc test indicates significant differences only between the “poor” and the “wealthy” SES groups \([p=.001]\), and the “poor” and “average” SES groups \([p=.020]\) in terms of their subjective well-being. There are no statistically significant differences between the “wealthy” and “average” SES groups.

Visualizing the differences in subjective well-being levels between SES groups within a village and across SES groups between villages helps to understand how differences in social stratification correlate with individual well-being scores (Figure 8.3).

\(^{99}\) To run these intra-village variability tests, I had to calculate the average subjective well-being scores for each household and generate an “average household well-being score”; this allowed me to turn subjective well-being, which was initially an individual-level variable, into a household-level variable.
According to the data, the well-being score of “wealthy” villagers from Kale is, on average, 3 percent higher than that of the “wealthy” villagers from Gyepo. This could be explained by the fact that those “wealthy” villagers living on the road are typically the ones engaged in business, and they are constantly trying to succeed in the face of ever-increasing competition and road-induced stressors and, therefore, have to sacrifice their well-being. In contrast, the “wealthy” villagers who live in Kale have the highest well-being (with an average score of 83 percent) of any group (when breaking well-being down by SES categories). This could be explained by the fact that the wealthy in Kale have access to the amenities that the road provides (they can easily purchase foods to supplement their agricultural yields, which increases their food security and dietary diversity), yet they are not battling with the stressors that accompany life on the road.

Of the wealthy households in Gyepo, 60 percent reported having a “successful business”; the other 40 percent of wealthy households reported that they are trying to start a business.
According to my interviews, another opportunity that brings a heightened sense of well-being to individuals is the ability to have a ceremony (puja) for loved ones when they fall ill. These ceremonies typically involve hiring monks from an adjoining village to conduct the ceremony (the monks are typically paid in both food and money). Additionally, the family hosting the puja will cook food for the entire village for the duration of the ceremony. From my experience and interviews, it is most often just the “wealthy” families in the villages who can afford to provide such a service to their loved ones, one that is big enough for the whole village to attend.\textsuperscript{101}

These ceremonies are seen as both curing in the medical sense and healing in the spiritual sense. According to one 46-year-old father in Gyepo who was in the process of organizing a puja for his 15-year-old daughter who had to return home from school because she had fallen ill and was frequently having seizures:

The ability for me to be able to organize a \textit{puja} at my home is a type of medical service I can provide to my daughter; I hope it will bring calmness to her, and I know it will bring calmness to us (the family). This \textit{puja} will last three days. I have brought monks from the next village to conduct the religious ceremony. My hope is that they (the monks) will help my daughter and bring good health back to her.

The well-being lists illustrate that “have time for religious practice,” “have calm/positive thoughts,” and “are in good health” are all indicators of well-being. A ceremonial event like the \textit{puja} described above is a way for individuals to attain all of these states of being. Ceremonies such as this can also be an opportunity for families to “have access to quality family time.” Given the cost involved, however, it is mainly the “wealthy” families who have the ability to access these well-being attributes/items via a ceremony or \textit{puja} where the entire village comes together. Although the \textit{puja} was a time for healing, I noticed over the three-day period that the entire family was cooking and laughing together, all the while spending quality time. It certainly

\textsuperscript{101} There are, of course, many smaller-scale religious ceremonies or rituals that occur. In some families, these small-scale rituals occur as often as every day. The ceremony I am describing, however, included the entire village and occurred over a three-day period; this is a much more infrequent occurrence and is typically hosted by families who have the financial means to do so.
seemed like an event that heightened the general sense of well-being for the whole village, not just the family of the girl who had fallen ill.\textsuperscript{102} 

The following photograph (Figure 8.4) is of the monks making offerings (out of a dough-water mixture) and painting them, a task done in the days leading up to the ceremony. These offerings are given to the spirits throughout the ceremony to help cure the aforementioned 15-year-old girl of her seizures and afflictions.\textsuperscript{103} 

\textsuperscript{102} One facet of the \textit{puja} that I found extremely interesting was that during the daytime, when the monks were chanting and offering rice and the other offerings (pictured in Figure 8.4) to the spirits, nearly all of the villagers were sitting outside, eating food and playing games. Hours went by when I was the only person in the room with the monks. When I asked why this was the case, people responded, “It does not matter if we are inside or outside; the monks are talking to the spirits and trying to heal her just the same. I prefer to sit outside in the nice weather and play dice with friends.” 

\textsuperscript{103} After the \textit{puja} ended, the girl stayed at home for two weeks resting with her family. She then returned to school, and, as far as I know, her seizures subsided and she felt much better. In her case, her father decided to use a mixture of Tibetan medicine (i.e. the religious ceremony, during which she was also given medicinal herbs), and allopathic medicine (she was also given medicine that works to combat seizures from a local health post).
Figure 8.4: Local monks making the offerings for the traditional healing ceremony
8.5.3 Subjective Well-Being Levels of those with ‘Average’ SES

The well-being scores of the “average” SES groups tell an interesting story. The data illustrate that those with “average” SES in Gyepo have, on average, a 12 percent higher well-being score than the corresponding villagers from Kale. Interview data suggest that this is a result of this group in Gyepo striving toward upward mobility and realizing that this movement is in fact achievable. Studies have shown that individualism correlates positively with happiness (Veenhoven 2000); if “average” SES villagers have the sense that a road-related opportunity is within reach, that could explain why their overall sense of well-being is much higher than their Kale counterparts, who may not be getting the sense that their lives have the potential to change drastically for the better. The difference between subjective well-being levels is most notable between these groups in both villages.

8.5.4 Subjective Well-Being Levels of the ‘Poor’

On average, the “poor” villagers in Gyepo have lower well-being scores than any other group. Their average score is 7 percent lower than the poor in Kale, and an astounding 20 percent lower than those with “average” SES levels in Gyepo. Interview data suggest that the poor in Gyepo have a higher percentage of debts than other families because they sometimes spend beyond their means on market items that are easily accessible. Families who are in difficult financial situations have a harder time maintaining states of being that are conducive to higher levels of well-being (i.e. calm mind, ability to take things lightly). Considering poor villagers spend most of their time concerned with acquiring basic necessities (for example, food and clothing), it makes sense that many do not have “time for religious practice” or “the opportunity to pray/live above the village when older,” two markers of well-being in Gyepo.

In comparison, the “poor” villagers in Kale have an average subjective well-being level that is nearly identical to that of the subjective well-being levels of those with “average” SES levels in Kale (65 percent and 66 percent, respectively). The data indicate that poor villagers in Gyepo are the ones with the lowest well-being scores, and the ones whose general satisfaction with life is suffering as a consequence of the road.
It is notable that the number of people in each SES category is different across villages. I first presented this data in Chapter 5, which illustrated that wealth disparity is higher in Gyepo than it is in Kale. While assessing villagers’ subjective well-being levels by SES category, it is important to note how many households are in fact in each SES category, to determine how many villagers, are, for example, suffering from low levels of well-being because they are “poor” and living in Gyepo.

The SES data illustrate that Kale is much more equal in terms of SES. Because SES is positively correlated with subjective well-being, this could explain why there is slightly higher variance amongst the subjective well-being levels in Gyepo. In Kale, most villagers (83 percent) are “average” SES, while only 7 percent are “wealthy” and only 10 percent are “poor.” In contrast, Gyepo has fewer villagers constituting the “average” SES group (55 percent or nearly half of the village) while 16 percent are “wealthy” and 29 percent are “poor.” Of concern here is the 29 percent of the households in Gyepo who are “poor,” as they have a low average well-being level of 58 percent.

In addition to socioeconomic status being a strong predictor of villagers’ subjective well-being, the amount of human capital present in a household also proved to have a statistically significant relationship with well-being scores (see Table 8.5).

8.5.5 The Impact of Human Capital on Subjective Well-Being

Human capital, defined as, the number of able-bodied adults that help with household livelihood tasks (i.e. agriculture, cattle, trade, business ventures, household tasks, raising children), is an important variable to consider when assessing, or predicting, villagers’ well-being scores.\textsuperscript{104} A one-way ANOVA test illustrated that human capital has a statistically

\textsuperscript{104} In order to determine each household’s human capital level, I asked the household members how many able-bodied persons they have living in the household. I then categorized human capital into four separate categories (see Table 5 in this chapter for more details). Knowing that having one able-bodied person in the household is a quite unique circumstance, I wanted to have one category that solely consisted of households where the human capital = 1. Households that either had two or three able-bodied persons were more standard, but from participant observations and interviews, I knew that the household with three persons was at a substantially higher advantage in terms of the amount of workload that would fall on one particular person. Having a human capital number of more than four was not unusual, but it was rare (given the amount of people that had out-migrated). For this reason, I wanted to create a fourth
significant relationship to villagers’ subjective well-being scores, which suggests that the samples were not drawn from populations with the same means, $F(3,54) = 2.92, p = .042$.

On average, Humli villagers work 13 hours per day (this number is based on interview responses); this number increases or decreases, however, based on how many additional adults are in the household and available to help with livelihood and/or domestic tasks. The fact that these two variables have a statistically significant relationship to one another is easy to comprehend; it would make sense that an individual surrounded by a large number of able-bodied household members would feel more carefree and supported (for example, if that person fell ill, there would be more people in the household to complete the daily tasks). Along these lines of thinking, a higher level of human capital is not too much different than a strong insurance policy.

However, it is interesting to note that even though, in general, villagers’ well-being scores increase as their human capital increases, individuals who are single heads-of-households (i.e. they have a human capital level of 1) actually have a higher average well-being score than those individuals who have a human capital level of two or three. The following table (8.7) illustrates this phenomenon:

<table>
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<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
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<td>72.7500</td>
<td>14.24028</td>
<td>5.03470</td>
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<td>84.6552</td>
<td>51.00</td>
</tr>
<tr>
<td>2.00</td>
<td>26</td>
<td>64.7308</td>
<td>13.18653</td>
<td>2.58609</td>
<td>59.4046</td>
<td>70.0569</td>
<td>45.00</td>
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<tr>
<td>3.00</td>
<td>18</td>
<td>71.5000</td>
<td>9.08295</td>
<td>2.14087</td>
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<td>6.17927</td>
<td>63.6157</td>
<td>95.3843</td>
<td>54.00</td>
</tr>
<tr>
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<td>58</td>
<td>69.4655</td>
<td>13.01984</td>
<td>1.70959</td>
<td>66.0421</td>
<td>72.8889</td>
<td>45.00</td>
</tr>
</tbody>
</table>

This table illustrates that the mean level of subjective well-being for an individual who has a low level of human capital (one person) is actually higher (mean well-being level = 73 percent) than that of the person who has a low/medium level of human capital (two persons) (mean well-being level = 65 percent), or than that of the person who has a medium/high level of human capital (three persons) (mean well-being level = 72 percent). Ethnographic data suggest category (high human capital), which included all of the households that had four or more able-bodied persons.
that because social networks are so strong in the villages, people are very cognizant of the households that only have one able-bodied person and consciously make an effort to help him/her in any way they can. For example, it was very normal for villagers to provide single heads-of-households with yields from their greenhouses, to take their animals with them to the yak camp, and/or to make purchases at either the temporary market at the terminus of the road or at the market in China on their behalf. The aforementioned data illustrate that intra-village support of single heads-of-households clearly has a positive impact on the overall well-being level of those individuals who do not have any other able-bodied adults living with them.

On the contrary, those individuals with families who have a low/medium level of human capital (two persons) are the group with, on average, the lowest level of well-being. Notably, most households in the villages only have two able-bodied persons (45 percent of households have a low/medium human capital level). Even though a low/medium level of human capital is fairly low, it is relatively common, so villagers do not take special care of household members in such a situation. Given that the community supports single heads-of-households to such a great extent, it becomes clear that the low/medium human capital level is actually the worst circumstance to be in in terms of livelihood burden, and, as the data illustrate, in terms of subjective well-being.

Individuals who have a medium/high level of human capital (three persons) have, on average, a higher well-being level than those individuals with a low/medium level of human capital (the average subjective well-being scores are 72 percent and 65 percent, respectively), though their well-being levels are still not as high as the single heads-of-households or those with a high human capital level. Reasons for this are very similar to why those individuals with only two able-bodied persons have a low average subjective well-being level (villagers are not willing to help out households who have only three persons, as this is not a unique family situation). The following photograph (Figure 8.5) is of a family in Gyepo that has a medium/high human capital level.
Although this is quite rare, in this particular family the husband (pictured left) lives at his wife’s natal home because otherwise her mother (pictured right) would have been alone. In some cases, even though the kinship pattern is patrilocally (a pattern of marriage in which the couple settles in the husband’s home or community), there are times when a family decision will be made that it is best to have the husband move to his wife’s to more equally distribute the human capital.

Individuals with the highest average subjective well-being level are those who have a high level of human capital (four or more persons) (mean well-being level = 80 percent). The familial support that these individuals receive is not only beneficial in terms of the household being able to diversify their livelihoods, but it lessens the stress that any one individual needs to take on. Individuals from a high human capital household have a larger support network, which
is useful in the sense that if someone falls ill, others can cover the workload without it causing an overwhelming burden. Notably however, there are only six households (see Table 8.7) that have a high human capital level. This is a result of the fact that out-migration of villagers in Humla is increasing. With opportunities for both wage labor and higher education being so minimal in Humla, numerous individuals leave their natal villages in search of greater opportunity.

“Have the chance to live with family members” was one of the well-being indicators that key informants from both Gyepo and Kale indicated as being important to well-being achievement; Humlis are very family oriented, and thus, those individuals who do not have to be separated from their family have, according to interviews, a higher sense of well-being.

The subjective well-being data confirm the economic and sociocultural benefits of a very large household ($\geq$ four persons), but that being a single head-of-household actually results in a higher level of overall well-being than if one lives in a household with only two or three persons.

### 8.6 Conclusion

The subjective well-being data illustrate that Gyepo has a higher average well-being score than Kale, in addition to having a few individuals who have a well-being score of 100 percent. The well-being disparity levels, although not large enough to warrant rejecting the null hypothesis, are slightly higher in Gyepo than in Kale. Whether or not this disparity came as a result of, or preexisted, the road is difficult to determine without a longitudinal study design. However, considering that most of the individuals with higher well-being scores in Gyepo are new business owners does seem to be evidence for the former. Interview data suggest that the road is creating a new environment—one with opportunity but also one with increased road-induced stress and competition. Those individuals who can capitalize on these opportunities often have a higher sense of well-being, but of those who cannot, many reported being less content than they were prior to the road’s arrival. Given that there is more equality in Kale, people do seem more satisfied with life in general, specifically in terms of being able to achieve what they consider necessary for a high quality of life.

The individuals with the highest levels of subjective well-being, based on the cultural domain analysis, are either the wealthy living in Kale or are living in a household with a high level of human capital. The fact that both socioeconomic status and human capital are
statistically significant determinants of subjective well-being indicates that although well-being disparity levels vary between villages, there are many variables at play that determine well-being levels aside from the one’s proximity to the new road alone.

The well-being lists in Gyepo and Kale have both similar and unique components to them. The fact that there are differences implies that value ascription of well-being items can, and most likely will, vary from place to place. This particular case illustrates that even two villages with the same ethnic and religious composition, located in the same region of Nepalese Himalaya, are different in terms of how inhabitants conceptualize subjective well-being. This variability highlights the fact that what constitutes subjective well-being is far from universal, and that in order to make assessments regarding an individuals’ well-being level, an emic perspective is required. Using cultural domain analysis to quantify well-being in Gyepo and Kale provided very useful information in terms of villagers’ value system, how items of value are ranked, as well as how many individuals actually possess these items/attributes. Here I summarize the main points pertaining to the results discussed throughout this chapter:

• How villagers conceptualize subjective well-being differs from village to village; while both lists include values important to the Buddhist moral code, Gyepo’s list includes more “luxury” items while Kale’s list includes more “basic needs” items.

• An extremely small difference in the coefficient of variance exists between the subjective well-being levels in Gyepo and Kale (0.180 and 0.182, respectively); since the difference is so small, this finding leads me to fail to reject my null hypothesis.

• The relationship between subjective well-being and proximity to road is not statistically significant.

• Socioeconomic status is a strong predictor of subjective well-being levels; although this relationship is complex, “poor” villagers in Gyepo have the lowest well-being scores, while “wealthy” villagers in Kale have the highest well-being scores.

• Human capital is a strong predictor of subjective well-being levels; although well-being scores generally increase as human capital increases, single heads-of-households have higher well-being scores than individuals from households with two or three able-bodied persons due to the strength of social networks and great amount of economic and social support from other villagers.
The arrival of a road in a previously roadless area is typically revered as “progress”, in the sense that increased connectivity, in terms of health care and economic transactions, has been achieved. Conventional thinking often leads us to believe that the arrival of a road increases the availability of food, although it has often been cited that the types of foods made available by roads often consist of packaged foods with low nutrient densities. This research illuminates however, that in terms of villagers’ health outcomes, the road itself and villagers’ “proximity to road” is only one of the many pieces involved in assessing villagers’ food security, diet and nutrition, and subjective well-being.

This research confirms that in general, villagers’ quantity-of-food related food security has increased since the arrival of the road in Humla, Nepal. Villagers reported having access to both a higher quantity and diversity of food now than ever before, in addition to stating that their food security-related anxiety and uncertainty levels have dropped since the arrival of the road.

My results however, also debunked some conventional myths about how rural roads impact food security outcomes. First, although there is a relationship between food security and “proximity to road,” this relationship is of an opposite nature than I had originally expected—villagers living near the road have higher food insecurity levels than those living far away from the road. This is partially explained by the fact that agricultural practices have remained more or less unchanged in areas farther away from the road, while families living on the road have started relying more on road-related nonagricultural wage labor.

Second, data illustrate that villagers have a more difficult time maintaining food security levels during the harvest season than they do in the drought season—another research finding which is contrary to popular belief. The reason for this is that during harvest season, villagers are engaged in a multitude of tasks to convert agricultural yields into consumable form in addition to travelling to the market to acquire purchased-foodstuffs. Villagers living near the road have a particularly difficult time maintaining food security levels during harvest season, due to high road-induced stress and anxiety levels as well as lack of the valuable resource “time.”
road-stressors have proved to have such a negative impact that both “average” and “wealthy” households away from the road are actually better off in terms of their food security levels than a household of any wealth category near the road.

Compared to many groups around the world however, the food security status of villagers in Gyepo and Kale village is not of grave concern; even “poor” villagers report having enough food to eat, even though they may not have access to amenities such as a watertight roof or latrine. The primary issue surrounding food security is that villagers are often so busy that they do not have the time or resources to properly utilize the food they have. Given these constraints, typical of resource-poor, remote environments, it is natural that villagers would turn toward the marketplace for access to items that make life easier, including foodstuffs that are quick to prepare, such as ramen noodles.

Although one might expect that consumption of these market-purchased foods would directly correlate to villagers’ proximity to the road, my research highlights that many other sociocultural variables (such as crop growing ability, topography and kinship networks) impact the variability of consumption levels, in some cases to a greater degree than villagers’ location. Additionally, my findings illuminate that men ascribe far more prestige and value to market-purchased foods than women. Almost all women reported that they prefer their locally produced foods to market-purchased foods because of the taste and because it gives them more energy. These results indicate that agency, in terms of individual decision-making, plays an important role in how villagers interact with the market, and whether this sociostructural change has and will continue to become a facilitator of unhealthy eating habits.

The variability of food consumption patterns directly translates to heterogeneous health outcomes, in addition to resulting in a population that is moving through the nutrition transition at different speeds. This research confirms that health issues pertaining to “overweight” and “underweight” are occurring simultaneously within the villages. While a notable percentage of individuals living on the road are “overweight,” there is still a considerable percentage of the population in both villages that are “underweight.” Nepal still suffers from an array of infectious diseases; this, coupled with the fact that my data illustrate that a portion of the population is at risk of developing diet-related noncommunicable diseases (DR-NCDs), could be an indication that a double-burden of disease exists in this region. This variability in health outcomes leads me to determine that the nutrition transition model, although useful in assessing dietary, nutritional
status, and morbidity transitions on a national level, is too general a model to be used to predict such transitions on a local, village level.

Based on my dietary assessment and anthropometric results, I concluded that children living near the road have improved dietary health outcomes because of their better access to animal sourced protein and dairy (via both the road and nuances associated with grazing patterns). Adults however, due to the constant temptation of Chinese liquor and foods high in sugar, have a higher likelihood of developing DR-NCDs if they either live near the road or are engaged in a livelihood that requires them spending a fair amount of time near the road.

During my pilot study in 2013, it seemed as though every villager I spoke with in Upper Humla was excited about the arrival of the road. They claimed it would make life better, in one way or another. My subjective well-being data confirm that villagers’ well-being is not related to their proximity to the road; in fact, it is more contingent upon their socioeconomic status and the level of human capital within their household.

Further research pertaining to the amount of food villagers have stored at any given time would complement the food security data I acquired via the HFIAS questionnaire. Food storage data would allow concrete statements to be made as to whether or not villagers actually run out of food periodically or are actually just “too busy” to covert what they have into consumable form. Additionally, further research pertaining to causes of morbidity and mortality is required to confirm that a double-burden of disease exists as a consequence of the new road in Humla District. Blood tests could also be used to confirm what my dietary data suggest—that most villagers in Upper Humla are lacking in vitamin A, vitamin C, and zinc. This additional information could be used in conjunction with the results from my research to make a case that micronutrient supplementation should be a priority item in this region.

Based on my food security data, I urge NGOs and government food security programs to target program interventions during the harvest season and to those with low socioeconomic status, regardless of the distance a family lives from the new road. Additionally, I recommend that food security initiatives mind both the sustainability and nutrient density of their assistance. In addition to working with villagers to implement the dietary recommendations I presented at the end of Chapter Seven, I urge local NGOs to provide technical assistance for the construction of chicken coops as this is a culturally appropriate avenue for villagers’ to increase their intake of
animal protein and dairy. Not only would these interventions improve villagers’ dietary health, but they would most likely improve villagers’ subjective well-being levels as well.

This research highlights the importance of implementing ethnography to assess changing health outcomes. It required months of research living with villagers to decipher which time of year posed the greatest food security threat, what cultural nuances have dietary impacts, and how, for example, topography has an effect on eating habits. My aim is that this research encourages more open-minded thinking in terms of what a road in a previously road-less area will or will not bring, and that although roads do bring access, connectivity, and changing food-related behaviors, they most often are just one of the numerous variables that require consideration when assessing health outcomes.
Chapter 10
Epilogue: Earthquake Victims Overshadowed by Nepal’s New Constitution

Towards the end of my fieldwork, on April 25, 2015 a massive earthquake struck Nepal. Numerous aftershocks followed. In the midst of the earthquake rebuilding process, a blockade began in which all goods were banned from entering the country from India. This chapter is a reflection of the current state of affairs in Nepal as of late January 2016. The information is based primarily on interviews, informal conversations, and personal observations from my follow-up trip to Kathmandu, Nepal, which took place from late December 2015 until late January 2016. I wrote this chapter during and shortly after my visit to Nepal, and, therefore, the facts and situation described in this chapter are merely a representation of how I experienced life, and how I was told life in Nepal was, during these months of the blockade. This information is subject to change.

10.1 Introduction

Imagine a country where fuel can only be purchased on a black market. Where there is only 10 hours of electricity per day. Where cooking gas is near impossible to get and 10 times as expensive as it was only a few months ago. A country where every day, another business declares bankruptcy. For the people of Nepal, this description is not imagination; it is the harsh reality of life since the India Blockade began on September 23, 2015.

The India Blockade began as a response to Nepal’s new constitution, which was finalized on September 20, 2015. This blockade has yielded countless negative impacts on Nepal’s economy, its earthquake-rebuilding efforts, and on the mental state of its citizens. However, obtaining any sort of news on this matter was extremely difficult from abroad; from September to December it was rare to see news articles or updates on headline news channels pertaining to the blockade that was plaguing Nepal. To better understand both the nuances of this blockade and how it was potentially affecting Humla District, I spent an additional month (December to January) in Kathmandu. Based on the data I collected during this visit, as well as my personal observations, I use this epilogue to provide a brief summary of the situation in Nepal as I have come to understand it.

To begin, the Madhesi, an ethnic group from the southern plains of Nepal, have for decades been marginalized and discriminated against by the upper-caste Hindus who primarily
live in the hill region of Nepal and have the political and economic majority. In part because of their Indian origin, in part because of their ongoing ties to India due to cross-border marriages, and in part because of their darker skin color, the Madhesi have struggled for equality and for equal representation in the government. The Madhesi believe that if the new constitution remains as it is now, its laws will keep them in a position where further marginalization is inevitable.

10.2 Reasoning Behind the Blockade

The Madhesi are disconcerted by two pieces of Nepal’s new constitution: the new federal delineation of states, and the unequal value of women as it pertains to citizenship laws.

10.2.1 The Federal Delineation of States

For many decades, Nepal was delineated into five different administrative zones where each zone included a mountain section, a hill section, and a plains section of the country (see Figure 10.1).
On August 8, 2015, as part of the new constitution, the three most powerful political parties in Nepal (Nepali Congress, CPN-UML, and UCPN-Maoist) proposed a six-province model to federate the country. Under this model, each of the provinces still shares a border with India (see Figure 10.2), though the country would be delineated differently than it had been for decades.
Two weeks after the announcement to federate the country into six provinces, leaders from the major parties redrew the map, breaking the sixth province into two: All areas east of the Karnali river were kept in province six, while those west of the Karnali were put into a seventh province.

The new six-province model sparked many protests, particularly in western Nepal and among the southern districts. In the West, protests were launched by ethnic groups mainly in Jumla and Surkhet, who expressed dissatisfaction over the merging of the Far-West Development Region with most parts of the Mid-Western Development Region (business.standard.com). These protests resulted in three deaths in Surkhet (a capital town in the western region of the country), and quickly thereafter, the top leaders of the four major parties (Nepali Congress, CPN-UML, UCPN-Maoist, and Madhesi Peoples Right Forum-Democratic) agreed to further delineate province No. 6 into two separate provinces, thus creating the seven-province model (see Figure 10.3) (The Business Standard). The seven-province model, although it did address the concerns of those in the western part of Nepal, did not address the concerns of the Madhesi in the south, which caused even more agitation from those whose concerns were not answered.
Figure 10.3: The contested seven-province model of the new constitution: The Districts of Kanchanpur and Kailali (far-west) and the Districts of Sunsari, Morang, and Jahpa (far-east) are the districts being contested over in the current blockade. Madhesis are urging that these districts be joined to the two larger Terai provinces (two and five).

The Madhesi are unhappy with the seven-province model, as they do not want to share provinces with the hill districts. They feel as though they will be further marginalized and that their representation in government and political decisions will be minimal. Additionally, they are urging that the Terai districts proposed to become part of Province one and Province seven (see Figure 3) should instead be added to Province two and Province five (essentially, the Madhesi protestors are urging the government to consolidate the Terai into two provinces stretching along the entire length of the southern border with India).

10.2.2 Unequal Treatment of Women

The second issue that not only the Madhesi people have with the new constitution is that, according to many women’s groups and campaigners, the new document discriminates
against women in a society that is already very patriarchal. The new constitution states that if a Nepali woman marries a foreign man, the child cannot become Nepali unless the man first takes Nepali citizenship. This is different if the husband is Nepali, as the constitution states that the children can become Nepali regardless of the mother’s nationality. In the eastern Terai, the Madhesi communities are very close (both ethnically and socially) to the Indians just across the border. Because there are so many cross-border marriages, this group is particularly discontented, as they believe Nepal’s new constitution will disproportionately affect them (madhesiyouth.com).

10.2.3 Who Is Causing The India Blockade?

The seemingly straightforward question of “Who is causing the blockade?” is in fact very complicated. The government of Nepal has accused India of imposing an undeclared blockade. India has denied these allegations and has responded by saying that the Madhesi protesters are the ones causing the blockade, as they are the ones literally “blocking” the border at Birganj, a town on the India/Nepal border most frequently used for the transport of goods coming into Nepal from India. However, the day that the blockade began, the Indian Express newspaper reported that the government of India had demanded specific changes to the new Nepal Constitution. Other sources confirmed that that essential daily supplies were being blocked on the India side.

It seemed that India’s mere “noting” of Nepal’s Constitution—rather than a congratulations that it was drafted after so much time—was the main driver behind Nepali citizens viewing India as the source of the blockade, given the Twitter fire storm of the #BackOffIndia (The Kathmandu Post) movement. Because the majority of those in Nepal believe that India is behind the blockade, it is, throughout Nepal, termed “The India Blockade,” and for this reason I will continue to use this label throughout the chapter.

When assessing the roots of this protest, it is important to note that India and the Madhesi are not exclusive entities. According to local sources, there are reports that Indian politicians politically and financially support the Madhesi parties, if not the Madhesi protestors themselves. In recent months, the protests in the south of Nepal have escalated to new heights. For example, between September and January, seven children lost their lives in the violent protests. These children were either in the line of fire between protestors and security forces or were injured on
one of the numerous public buses that were vandalized while driving in the southern region of Nepal. Protestors have been throwing bricks at the windows of public buses, which increased the danger of traveling by the bus through the Terai. Many people have chosen not to travel, and many bus drivers purposely broke their windshields and windows before traveling to the area.

This blockade has had enormous impacts on the country because it has decreased availability and increased prices of numerous goods, including fuel, earthquake relief materials, and medicine, as well as caused numerous negative psychosocial impacts on the people of Nepal (Poudel 2016).

10.2.4 The Impacts of the India Blockade

Nepal imports all of its petroleum supplies from India (roughly 300 fuel trucks enter Nepal daily, though this number has decreased to intermittent passage of five to ten fuel trucks since the start of the blockade). Quickly after the blockade began, Nepalis had to resort to the black market to purchase fuel. According to a 29-year-old male in Kathmandu, “The price for fuel on the black market is now USD$2.50/liter….A few months ago it reached a high of USD$10/liter.” The black market price for fuel fluctuates between USD$2.50/liter and USD$3.50/liter. Pre-blockade, the Nepali government regulated the price of fuel at NPR104 per liter (roughly USD$1/liter). This indicates that even at these relatively “low” black market fuel prices, the fuel cost has still increased by 100 to 200 percent. These prices are even more shocking when you consider the average salaries of workers in Kathmandu. Take for example taxi drivers; they earn NPR 200 to 300 per day after car rental (700-800) plus fuel (these figures are from research conducted before the India blockade began). The economic repercussions of these extremely high prices have had numerous impacts on both household economies and the overall economic situation of Nepal.

In addition to the price increases, it is important to note that the nature of the petrol market changed dramatically. Instead of relying on formal networks to bring fuel across the border to Nepal, the current situation relies on ordinary people to transport many different types of fuel (i.e. petrol, diesel, and kerosene) across the border into Nepal. Individuals would take buses to the border, walk across to India, fill a 20- or 30-liter can/plastic bucket/any vessel they could carry, cross back over the border to Nepal, and take another bus back to Kathmandu. On
their journey, they would most likely have to pay off the bus driver and a few policemen. According to an interview with a foreign consultant for the U.N., “I think the volume of cars on the road from October shows that fuel was flowing…just in a different way, and in physically different spaces than before.”

The quality of fuel is also severely deteriorating as sellers are adding thinners to the fuel to increase the volume and their economic returns. Putting poor quality fuel into engines has caused many taxis, private vehicles, motorcycles and scooter engines to fail. Often, this has pushed vehicle owners over the edge financially, as they often cannot afford to fix the engine.

These aforementioned fuel-related issues have severely limited the amount of public transportation around the valley. For example, numerous employees are not easily able to afford black market fuel to come to work. People are overcrowding the public transportation vehicles that are still in operation by either sitting on the roof of the vehicle or standing on the back bumper. Not only is this unsustainable, it is extremely unsafe. Many accidents due to overcrowding have already occurred. In January 2016, however, nearly four months after the India Blockade began, this alternate, illegal market for fuel has become so “normal” that the black market fuel prices were often printed daily in the newspapers.

Even throughout the India Blockade, the government has a small amount of fuel for public buses and other modes of public transportation, often requiring drivers to line up for three to four days to fill a tank of gas. Foreign diplomats and other agency workers such as those working for the United Nations also had other means of getting fuel, but these exceptions are far from the rule.

Many Nepalese, however, refuse to purchase fuel on the black market, knowing very well that their participation in this illegal, inflated market will be the only thing that sustains it. According to a local NGO manager, “We are having a hard time doing our work outside of the valley [Kathmandu] because we have no fuel for our vehicles…. We have to be transparent to our donors, so we are not going to support the illegal black market.” According to trekking agency coordinator in Kathmandu, “We only buy the minimum, what we need. We don’t want to support the black market any more than we really have to.” It can be argued, however, that the formation of this “black market” is the first time an actual free market for fuel existed in Nepal, as prior to the blockade, the Nepali government subsidized fuel prices.
Others have coined a new term, “the white market” that they use in reference to fuel that did in fact come from the black market, but that was acquired through family or kinship connections. For example, a stationary store owner in Kathmandu, when asked if he got diesel to run his generator from the black market, responded “Oh no no! I got it from my brother on the white market.” Local sources explained to me that the use of this new term “white market” could be in response to the term “black market” having so many negative connotations.

Others however, have turned big profits from the blockade. According to the Kathmandu Post, numerous teachers living in the Terai have decided to walk across the border into India, purchase fuel, and carry it on their backs back to Nepal where they “Turn more than three times the profit than they did as teachers” (The Kathmandu Post). Much talk is also going around Kathmandu that some individuals within the high ranks of the Nepali government are getting kickbacks from the black market, which could also be a disincentive for them to abolish the black market.

Although fuel prices are extremely high, in general, if one has money and wants to purchase fuel, it is available. Another consequence of the India Blockade, which is perhaps impacting the poor at disproportionate levels, is the extremely low availability and high price of cooking gas. Most Nepali families that live in and around the city operate their cooking stoves with liquefied petroleum gas (LPG). Gas-filled LPG cylinders typically cost NPR3600 (roughly USD$36). If someone already had a cylinder and just needed a gas refill, the government-mandated price is NPR1400, which is quite affordable. During the India blockade however, these LPG gas prices increased to NPR9000 (roughly USD$90). Even for households who were able to afford this price, simply finding cooking gas was often impossible.

The Nepal Oil Corporation usually transports the tankers to collect the LPG gas from India; because the tankers could not get across the border, acquiring cooking gas became a similar issue to that of acquiring fuel or petrol. Households again had to organize to purchase (typically via social networks) gas in the Terai at one of the other entry points (not Birganj, the main site of the blockade) and then brought back to Kathmandu, often on the back of motorcycles. The extreme shortage and high prices forced many families to cook without LPG gas at all, typically on open fires. Many people living in Kathmandu have reported that this has made the air quality even poorer than it normally was throughout the city.
In and around Kathmandu, one will not simply find firewood lying around or available for harvesting. So even those villagers who opted to forgo trying to save up for and find cooking gas still have to find and purchase the firewood. Those who are lucky have the option of cooking on the roofs of their homes in the city, while some others have a small open space outside of their home. I heard from many families in Kathmandu valley that numerous families are sharing one open flame and taking turns cooking. Often this meant that people were only able to eat one warm meal per day. Many families who were not so lucky to have this extra space were attempting this cooking method indoors, often without chimneys or ventilation. This typically ends with a reprimand by landlords who will not stand for the damage and the risk that comes from an open flame indoors.

The other option for cooking food is via electricity (for example, some households have rice cookers that operate with electricity). Nepal has had a vast shortage of electricity, even predating the India Blockade. In August 2014 “load-shedding” (the term used for when the electricity is cut off in and around Kathmandu) was up to 9 hours per day. In January 2015, “load shedding” increased to 11 hours per day. At the height of the crisis, “load shedding” had reached 17 hours per day. People lived, cooked, and productively engaged in everyday tasks such as operating a business, studying, and/or teaching university classes without the use of electricity. Lack of electricity also affected the two Internet companies that operate in Kathmandu, resulting in sporadic Internet access with weak signals. Frequently, the hours when the electricity worked were during the middle of the night. This forced many families to wake up at 3 a.m. to cook rice in their rice cookers for themselves and their families.

Once enough families began resorting to cooking with electricity, many of the inverters and transforms around Kathmandu blew fuses because too much electricity was being drained from them simultaneously. In early January 2016, hundreds of transformers had blown throughout Kathmandu. Days later, it was made known that there were no more transformers available for purchase in the entire Kathmandu valley (Giri 2016). Although there are mechanics who can fix these issues, according the news sources, they can only fix one to two transformers per day due to the complexity of the task.

The India Blockade caused more economic damage to the country than the massive earthquake of April 2015 and its numerous aftershocks. Many businesses, without adequate fuel and facing rising prices, have been forced to shut down. As of Jan. 12, 2016, 2,200 factories
stopped operations and more than 400,000 people have been rendered jobless in the Terai, the region of Nepal considered the “industrial heartland of Nepal” (Tripathi 2016). According to a report of Nepal Rastra Bank, one day of industrial closure causes losses worth NPR1.8 billion. In an effort to curb these economic losses, some banks extended the loan repayment deadlines for borrowers for one year, though this effort came too late for many enterprises (The Kathmandu Post).

Many restaurants in and around Kathmandu have had to close or at least operate during reduced hours with a limited menu, as many have had to cook food for patrons using a wood-fired stove instead of a stove powered by cooking gas. Many restaurant owners posted signs outside their businesses similar to this one:

Figure 10.4: Typical sign on front door of Kathmandu restaurant: Notice on the sign the phrase, “due to the continued blockade of Nepal by India.” This represents the overall sentiment of most Nepalese, who believe that it is in fact India that is behind the blockade, even though India has never outwardly admitted their role.
Aside from the enormous economic impacts of the blockade, the India Blockade succeeded in entirely overshadowing the thousands of earthquake victims who have not yet received the rebuilding and reconstruction assistance they were promised. Many villagers in the earthquake-affected areas are still living amongst the rubble from their fallen homes, without adequate shelter to endure the harsh cold of the winter months, and have yet to receive the stipends intended for warm clothing and food rations. By Dec. 26, 2015, twenty people who had lost their homes and possessions in the earthquake had died because they did not have adequate clothing or housing (The Kathmandu Post).

Because of the earthquake, billions of dollars in aid poured into the country from numerous donors. Legally, all of the donations coming into Nepal post-earthquake had to go through the Prime Minister’s Fund.105 The idea of channeling the relief dollars through the Prime Minister’s Fund was that this would help to both eliminate corruption and allow the Nepali government to strategically allocate the total amount to those in need. It is very difficult to believe, but when I arrived in Nepal on Dec. 30, 2015, the person who was to oversee these distribution efforts had yet to be elected. It was not until late December 2015 that Sushil Gyawali was formally appointed to organize the rebuilding efforts. Shortly after his election, the Nepali government formally announced April 24, 2016 as their formal “reconstruction start day.” This “start day” is nearly one year after the earthquake occurred. According to the Nepali government, part of the reason for this long delay is that damage reports needed to still be received from all affected districts (The Kathmandu Post), though many believe this is just an excuse for the extremely long delay in post-earthquake reconstruction; many believe that the real reason for the delay in relief efforts has been a mixture of infrastructural inadequacy, government inefficiency, and preoccupation with the India Blockade.

Meanwhile, the newspapers ran daily reports of spoiled relief attempts, such as the tons of donated rice that had yet to be distributed and was found rotten in a warehouse. Simultaneously, local discourse circulating around Kathmandu included numerous accounts of earthquake victims who were left starving in their villages, without any food assistance.

105 In an effort to both limit corruption and ensure that relief funds were being distributed properly, the Nepal government created the Prime Minister’s Fund. The idea was that this would limit new organizations from popping up post-earthquake that perhaps did not have development and/or relief experience. However, those organizations (INGOs, NGOs) in Nepal that were established prior to the earthquake would still be able to accept donations and distribute them as they saw fit.
According to one business owner in Kathmandu who is personally involved with many grassroots relief efforts, “Our government wants to control all of the rebuilding efforts and wants all the spending to go through their channels. The INGOs and NGOs want autonomy, and they want to do things themselves. There is a lot of conflict at the moment between those two entities, resulting in nothing getting done.”

The delay in the earthquake relief has not only caused numerous issues regarding villagers’ inappropriate shelter and food security issues, but it has wreaked havoc on individuals’ mental health. One account that was particularly heart-wrenching was that of a 12-year-old girl from Sindupalchowk, one of the most affected areas north of Kathmandu, who lost both of her parents and all of her siblings in the earthquake. After seven days of not eating anything, with constant news and assurance that aid is on the way, this girl hung herself. She took her own life because she could not bear the situation any more. I heard this story from a monk at a monastery in Boudha, Nepal. As this and many similar stories continue to circulate around the country, local, grassroots efforts get re-motivated and reenergized to do what they can to help lessen the sorrows and burdens of those in need.

Perhaps the shining ray of light amidst all of this hardship is the local, grassroots relief and rebuilding efforts continue to provide invaluable assistance to earthquake victims across the country. Many local efforts did not funnel their relief dollars through the Prime Minister’s Fund, and therefore had access to them immediately. The issue now, however, is that many smaller NGOs cannot afford to rebuild with the cost of fuel and transportation so high. Additionally, many other products necessary for rebuilding (such as cement) have rapidly increased in price. According to one interview, “Although Nepal manufactures cement locally, there is one ingredient needed that we get from India. This is what is driving up the price.” In January 2016, cement was 300 times higher than the price it was pre-blockade.

While I was in a taxi in Kathmandu, the driver said to me, “The writing of the new constitution overshadowed the earthquake victims….Why, after waiting and postponing the writing of our new constitution for eight years, did they suddenly have to write one now?” It seems as though people are of two opinions: Some agree with the statement made by the taxi driver and argue that the government should have figured out a way to successfully allocate the relief funds and in-kind donations before drafting a new constitution, knowing that there would be some sort of backlash that would take some time to rectify.
Assembly (elected officials tasked with writing the constitution) already delayed the process, time and time again, for a total of eight years. Others I spoke with however, think the new constitution was a necessary step in the rebuilding process, and that without it, Nepal would have been unable to successfully rebuild the country. Their gripe seems to lie more with the fact that the government has no control over the Madhesi people, and they think one ethnic group’s concerns should not lead to such devastation in the entire country.

10.3 Impacts on Humla District

Upper Humla District, the site of my dissertation fieldwork, has been one of the least-affected areas in Nepal by the India Blockade. The major reason for the impact being so minimal is that the villagers in Upper Humla have the option of purchasing household goods, clothing, and food from across the border in China. Their reliance on India pales in comparison to other areas in Nepal.

In Simikot, however, the capital of Humla District, prices for goods and foodstuffs have increased due to the India Blockade (according to local sources, the price of most goods have increased by 300 percent since the beginning of the blockade). Again, since Humla is not connected to Nepal by any roads, all goods and foodstuffs need to be transported to Simikot by air, and therefore (due to the rise in transport costs) have become more expensive.

According to interviews with local Humli people, perhaps the biggest impact that the India Blockade is having on Humla District is that the availability of certain medicines is decreasing, and some medications are not available at all. Since all of the health posts in Humla that are government-run receive their supplies from Kathmandu, they are experiencing shortages. I interviewed one pharmacist in Kathmandu who reported, “These days, some medicines are hard to get…particularly antibiotics, because those we get from India. We are now in most need of diabetes medicine and hypertension medicine.”

One question I had hoped to answer during my January trip to Nepal was how the allocation of funds pertaining to the earthquake reconstruction might affect the amount of funds being allocated to the road in Upper Humla. According to a key informant, “The earthquake rebuilding will not impact how quickly they (the Nepali government) builds the road in Humla….They have always spent such a small amount on the road that they can, and will,
According to local villagers in Upper Humla, with whom I spoke on the phone from Kathmandu, the Nepal Army has now taken over the construction of the road in Humla. Progress continues to be made, even during the winter months. As of Jan. 18, 2016, the road is completely finished between Yalbang (through Kermi village) to Chyaduk (these villages are east of my case village by one to three days walk). Once the bridge over the Karnali (near Thumkhot village) is finished (which locals say will be by the spring of 2016), these completed road sections will be relatively easy to connect.

10.4 The End of the India Blockade

Every day in Kathmandu there is a rumor that the India Blockade will end tomorrow, or next week, or soon. On Jan. 5, 2016, the Madhesi Morcha (the political party that represents the Madhesi) formed a three-member task force with a plan to hold consultations with the representatives of the three major political parties in Nepal. The goal is to forge a common position on the contentious issues that the new constitution raised, including the revision of boundaries (the 7-province model). Currently, the Madhesi Morcha has submitted an 11-point demand to Nepal’s political leaders (The Kathmandu Post). But meetings continue to be held, and no agreement has been reached.

In an effort to form a more “united front” from which to discuss issues with the Madhesi Morcha, the different Maoist parties, which came into being after they parted ways with the UCPN (Maoist), are working to merge back with the mother party. There are currently five different Maoist parties in Nepal; there are even more factions within these parties, some of which are starting to formulate parallel government structures in the central, west, and far-west (Nepalmonitor.org). This aforementioned campaign aims to bring these parties together on Feb. 13, 2016, which is observed by them as “People’s War Day” (Kathmandu Post).

Although it seems as though strides are being made to settle this conflict, progress is slow and rarely transparent. No one seems to know when the India Blockade will end, or how long the Nepali people must wait in order to again live with some form of decency.

The India Blockade, after nearly 6 months, ended on February 5, 2016.
References


Morgan, Lynn M. “Latin American Social Medicine and the Politics of Theory.” *In Building a New...*


Soma Srivastava and Bhagwan Singh. “Food Security Status and Nutritional Adequacy in Arid Part of India: A District Level Analysis.” Journal of Agriculture and Life Sciences ISSN 2375-4214 (Print), 2375-4222 (Online) Vol. 1, No. 2; December 2010.


# Appendix

## A4.1 Food frequency questionnaire

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<th>Food Frequency Questionnaire</th>
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<td>Hamis District, Nepal</td>
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<tr>
<th>Date</th>
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<td>Circle one: Yari or Chala</td>
<td>SES Rank</td>
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<td>Circle one: Harvest (bail) or Drought</td>
<td>Name of Respondent</td>
<td>BDS</td>
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*Indicates that recipe is used. id = local Hindi dialect

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<th>TYPE OF FOOD</th>
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<td>Nato Roti (Millet Roti)</td>
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<td>Soybeans</td>
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<td></td>
<td></td>
<td>1xWeek</td>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Butter**
- Salted butter: cups
- Other butter: cups

**Oil**
- Mustard oil: cups
- Canola oil (Chinese oil): cups
- Other oil: cups

**Tea**
- Black tea (Nagthang): cups
- Tea Bhottu (Butter tea): cups
- Other tea: cups
- Coffee: cups
- Nescafe: cups

**Other Drinks**
- Coke: bottle
- Sprite: bottle
- Fanta: bottle
- Red Bull: bottle
- Flavored juice: cups
- Other non-alcoholic drinks: cups

**Alcohol**
- Rice beer (dai chang): cups
- Raki beer (Nye chang): cups
- Beer (from China): 16 oz
- Arak (Distilled Chang): cups
- Local Arak: cups
- Other Alcohol: cups

**Spices**
- Curry: bar(s)
- Chips (unpackaged etc): bag(s)
- Other packaged candy: bag(s)
- Masala: 1/2/4 lbs
These are the nutrition composition results for the six local Humli foods that the Department of Food Technology & Quality Control tested in Kathmandu, Nepal. These local foods are: Tsampa (barley porridge), daikon radish, chhurpi (local cheese), dhee (female yak) fat and butter, and local butter tea.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moisture</td>
<td>7.08</td>
<td>16.59</td>
<td>9.17</td>
<td>95.15</td>
<td>67.81</td>
<td>14.35</td>
</tr>
<tr>
<td></td>
<td>Crude Fat</td>
<td>3.37</td>
<td>0.77</td>
<td>5.3</td>
<td>96.15</td>
<td>67.81</td>
<td>14.35</td>
</tr>
<tr>
<td></td>
<td>Crude Protein</td>
<td>13.08</td>
<td>7.26</td>
<td>60.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Ash</td>
<td>2.23</td>
<td>6.95</td>
<td>3.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crude Fibre</td>
<td>1.21</td>
<td>7.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carbohydrate</td>
<td>72.12</td>
<td>60.76</td>
<td>21.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energy</td>
<td>Kcal/100gms</td>
<td>374.17</td>
<td>279.81</td>
<td>377.58</td>
<td>883.35</td>
<td>605.79</td>
</tr>
<tr>
<td></td>
<td>Calcium</td>
<td>mg/100gms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Phosphorus</td>
<td>mg/100gms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Iron</td>
<td>mg/100gms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Thiamin</td>
<td>mg/100gms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### A5.1 Kale socioeconomic status list translations

<table>
<thead>
<tr>
<th>English</th>
<th>Tibetan (in Roman script)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields that produce good crops</td>
<td>Toen Thok Dzangpo Yoepa</td>
</tr>
<tr>
<td>Jewelry</td>
<td>Phamai gencha dang nor yoepa</td>
</tr>
<tr>
<td>High # of fields (≥10)</td>
<td>Dxing Chenpo Yoepa</td>
</tr>
<tr>
<td>Are financially stable</td>
<td>Gyoo penJor Yakpoh yoepa</td>
</tr>
<tr>
<td>Own Business</td>
<td>Dtsong yakpo yoepa</td>
</tr>
<tr>
<td>High # of cattle (≥10)</td>
<td>Gochuk 10 Dhang Dzo 10 leh mei Nyung wah</td>
</tr>
<tr>
<td>Have 2nd household</td>
<td>Simikot Yang Nah KTM la Khim Nyipah Yoepa</td>
</tr>
<tr>
<td>Have been to KTM</td>
<td>Dza-daakh kaab KTM la doe-thaab yoe-pa</td>
</tr>
<tr>
<td>Can provide employment</td>
<td>Mei-laa yoe-pa (So-soe laay-ka laa Laay-rook yoe-pa)</td>
</tr>
<tr>
<td>Have dairy animals</td>
<td>Kar-saay yuung-khung Dee daang dzoma yoe-pa</td>
</tr>
<tr>
<td>No loan</td>
<td>Bhuloen mehpa</td>
</tr>
<tr>
<td>Clever/Efficient</td>
<td>Chang-poh Dhang Joenpoh Yin Pa</td>
</tr>
<tr>
<td>Access to tech support (i.e. greenhouse)</td>
<td>TrulChe Dhang LhokLeh Sok Dtsag Tsub Poh Yoepa</td>
</tr>
<tr>
<td>Have road access</td>
<td>Gya lam dhepo yoenah</td>
</tr>
<tr>
<td>Have transportation animals</td>
<td>Yak Dhang Dzo Mhangpo yoepa</td>
</tr>
<tr>
<td>No worry</td>
<td>Palpor mei-pai kyen-kyi samdrel mei-pa</td>
</tr>
<tr>
<td>Tin roof</td>
<td>Chak-Shok Yoepai Khanpa Sarpa</td>
</tr>
<tr>
<td>Have mattress</td>
<td>Dron-poh phep tse dhrumsei yoepa</td>
</tr>
<tr>
<td>Have proper clothing</td>
<td>Goe Yakpo</td>
</tr>
<tr>
<td>Ability to give loan</td>
<td>Dshen La Ngul Bhuloen Yhar Thupah</td>
</tr>
<tr>
<td>Visit other country</td>
<td>Chi Gyal la Drough wai Ghukab yoepa</td>
</tr>
</tbody>
</table>

### A5.2 Gyepo socioeconomic status list translations

<table>
<thead>
<tr>
<th>English</th>
<th>Tibetan (in Roman script)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to medical services</td>
<td>Dza-daakh kaab la doe-thaab yoe-pa</td>
</tr>
<tr>
<td>High # of fields (≥10)</td>
<td>Dxing Chenpo Yoepa</td>
</tr>
<tr>
<td>High # of cattle (≥10)</td>
<td>Gochuk 10 Dhang Dzo 10 leh mei Nyung wah</td>
</tr>
<tr>
<td>No tension</td>
<td>Seim Kyipo yoepa</td>
</tr>
<tr>
<td>Hardworking</td>
<td>Lehka Ngarpo Djeh thupkein</td>
</tr>
<tr>
<td>Own successful business</td>
<td>Dtsong yakpo yoepa</td>
</tr>
<tr>
<td>Jewelry</td>
<td>Phamai gencha dang nor yoepa</td>
</tr>
<tr>
<td>Can provide employment</td>
<td>Mei-laa yoe-pa (So-soe laay-ka laa Laay-rook yoe-pa)</td>
</tr>
<tr>
<td>Have no worry</td>
<td>Palpor mei-pai kyen-kyi samdrel mei-pa</td>
</tr>
<tr>
<td>High human capital (≥10)</td>
<td>Meh MangPoh Lehka Jaykehn yoepa</td>
</tr>
<tr>
<td>Financially stable</td>
<td>Gyoo penJor Yakpoh yoepa</td>
</tr>
<tr>
<td>Access to organic foods</td>
<td>SoeKyong leh Thap Pei Khalag Dzahkein</td>
</tr>
<tr>
<td>Antique memorabilia</td>
<td>Dren Tein kyi Nor Yoepa</td>
</tr>
<tr>
<td>Access to alcohol</td>
<td>AahRak Thung Wai GohKap Yoepa</td>
</tr>
</tbody>
</table>
## A7.1 Salt testing results (UNICEF project results, quantitative)

<table>
<thead>
<tr>
<th>Village</th>
<th>Goiter</th>
<th>Source of Salt</th>
<th>Iodine Content</th>
<th>Re Check Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simikot</td>
<td>No</td>
<td>NSTC (India)</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Simikot</td>
<td>n/a</td>
<td>NSTC (India)</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Simikot</td>
<td>n/a</td>
<td>NSTC (Hilsa)</td>
<td>Above 15 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Charu</td>
<td>No</td>
<td>Tibet (non-iodized)</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Yari</td>
<td>No</td>
<td>Hilsa (not sure which)</td>
<td>Above 15 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Chenduk</td>
<td>No</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Yalbang</td>
<td>No</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Kermi</td>
<td>n/a</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Gyepo</td>
<td>No</td>
<td>Tibet</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Gyepo</td>
<td>No</td>
<td>Tibet (non-iodized)</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Gyepo</td>
<td>No</td>
<td>Tibet (iodized)</td>
<td>Above 15 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Gyepo</td>
<td>No</td>
<td>Tibet (non-iodized)</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Gyepo</td>
<td>No</td>
<td>Tibet (iodized)</td>
<td>Above 15 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Kale</td>
<td>dk</td>
<td>Hilsa (not sure which)</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
<tr>
<td>Kale</td>
<td>yes</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Chenduck</td>
<td>no</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Kermi</td>
<td>dk</td>
<td>Simikot</td>
<td>Above 15 PPM</td>
<td>No</td>
</tr>
<tr>
<td>Kale</td>
<td>yes</td>
<td>Hilsa</td>
<td>0 PPM</td>
<td>Yes</td>
</tr>
</tbody>
</table>

## A8.1 Kale subjective well-being list translations

<table>
<thead>
<tr>
<th>English</th>
<th>Tibetan (in Roman script)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have access to education</td>
<td>Lob-juunk la Guc-kaap</td>
</tr>
<tr>
<td>Are kind to others</td>
<td>Shyenla Seam Sangpo</td>
</tr>
<tr>
<td>Have family members that get along</td>
<td>Nang Mei Nyam Zom Thupaa</td>
</tr>
<tr>
<td>Are in good health</td>
<td>Na-Tsa Methpa</td>
</tr>
<tr>
<td>Have a family</td>
<td>Khem-tsang Champo</td>
</tr>
<tr>
<td>Have time for religious practice</td>
<td>Choe Jea Ya La Deu-Tseu Yoepa</td>
</tr>
<tr>
<td>Have children that can 'stand on their own two feet'</td>
<td>Tugu Nam Rango Thonpa</td>
</tr>
<tr>
<td>Have opportunity to pray/live above village when older</td>
<td>Tsam la Thu-choe Yoepa</td>
</tr>
<tr>
<td>Have healthy children</td>
<td>Tugoe Nam troe-teen yakpa</td>
</tr>
<tr>
<td>Have a successful business</td>
<td>Tsong Yagpo</td>
</tr>
<tr>
<td>Have enough food for the household</td>
<td>Nangmie la khalak dza ya yuepa</td>
</tr>
<tr>
<td>Have calm thoughts, and a calm mind</td>
<td>Seam Gye-e chaakpoo Yoepa</td>
</tr>
<tr>
<td>Have access to transportation facilities</td>
<td>Lamdepo</td>
</tr>
<tr>
<td>Are financial stable</td>
<td>Paljor yaakpo</td>
</tr>
<tr>
<td>Do not have any debts</td>
<td>Buu-lung mie pa</td>
</tr>
<tr>
<td>Have the ability to take things lightly</td>
<td>dundaak tsangma lay-lhapoe nang-nie drup-thupa</td>
</tr>
<tr>
<td>Are able to travel independently</td>
<td>Ranwang du dro chukpaa</td>
</tr>
</tbody>
</table>
## A8.2 Kale subjective well-being list translations

<table>
<thead>
<tr>
<th>English</th>
<th>Tibetan (in Roman script)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time for religious practice</td>
<td>Choe Jea Ya La Deu-Tseu Yoepa</td>
</tr>
<tr>
<td>Have kind and positive thoughts</td>
<td>Seam Gye-e chaakpoo Yoepa</td>
</tr>
<tr>
<td>Savings</td>
<td>Ngultrang saak yoepa</td>
</tr>
<tr>
<td>Have household where all members cooperate</td>
<td>Nang Mei Nyam Zom Thupaa</td>
</tr>
<tr>
<td>Are friendly with all people</td>
<td>Shyenla Seam Sangpo</td>
</tr>
<tr>
<td>Have access to quality family time</td>
<td>Nang-mei la Deu Tsue Yoepa</td>
</tr>
<tr>
<td>Have the chance to live with family members</td>
<td>Nang-mei NyamZom Thupa</td>
</tr>
<tr>
<td>Are able to avoid quarrels</td>
<td>Trook pa Ma-Gyapa</td>
</tr>
<tr>
<td>Have a healthy economy</td>
<td>Paljor yaakpo</td>
</tr>
<tr>
<td>Are not greedy; content with what you have</td>
<td>Due -pa Chenpo Majey Pa</td>
</tr>
<tr>
<td>Have time for leisure 'party time' with friends</td>
<td>Drokpo la Deu Tsue Yoepa</td>
</tr>
<tr>
<td>Able to have 'tasty' foods</td>
<td>Tsaama Dshieem-po Saa-ya yoe-pa</td>
</tr>
</tbody>
</table>