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Pristine Places and Passive People? Responses to Neoliberal Development and Maoist Conflict in Nepal's Northwest Himalayas

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PRISTINE PLACES AND PASSIVE PEOPLE? RESPONSES TO NEOLIBERAL DEVELOPMENT AND MAOIST CONFLICT IN NEPAL'S NORTHWEST HIMALAYAS

By

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In Humla District, Nepal, agro-pastoralists' confrontations with forces of change in the last generation have altered villagers' abilities to gain access to scarce resources. Development efforts and Nepal's recent armed conflict, in particular, introduced novel technologies and ideologies that affected Humli vulnerabilities. This dissertation is based on field research comparing two Hindu villages in northwest Nepal during 2009 and 2010. One village had more extensive ties to development than the other, and these villagers and other change agents co-created transitional contexts of vulnerability in the post-conflict setting of rural Nepal.

An armed conflict dominated the political landscape in Nepal for nearly ten years, ostensibly to uplift downtrodden members of society. Humlis who joined the Maoists during the insurgency had higher average incomes and higher overall socioeconomic statuses than those who did not join. This research challenges conventional wisdom about how 'people's wars' motivate individuals of different social positions. Indeed, villagers' responses to development workers and Maoist combatants were surprisingly similar. Certain development processes had de-stabilized parts of the region, and contributed both materially and ideologically to the vulnerabilities people experienced during and following the conflict. The rise of Nepali democracy and the development industry since the early 1990s has presented new social networking and resource options to Humlis as well as exposing them to new risks and vulnerabilities. The villagers who resisted some of these novelties had better food security and health outcomes and less divisive experiences of the conflict than villagers more engaged with development.

Based on over a year of fieldwork (participant observation, surveys, interviews, and focus groups), statistical and ArcGIS analyses represent landscapes of health, health-seeking behavior, conflict, and kin networks in northwestern Nepal. These findings explore the integration of neoliberal development in this post-conflict setting in which cultural pluralism, caste, Hinduism and cultural conservatism all shape decision-making. They reveal the social and material resource conditions conducive to engagement in risky behavior in a politically and ecologically diverse and fragile context, with implications for Nepal's, and by extension other rapidly developing regions', ongoing development and contexts of vulnerability.

Introduction: Socioeconomic Conditions and Measurement in Humla District, Nepal

In my attempts to test models evaluating the supposed risk aversion of "peasants", I was simultaneously forced to confront my own (non-peasant) risk aversion. In fact, it was Nepal's 'peasants' who forced me to challenge my cowardice and take on more risk. While the Nepali citizens among whom I did my fieldwork did take part in strategies that were intended to minimize vulnerability, I spent most of my time in Humla District, Nepal in awe of the strength, flexibility, and vivacity with which many of the villagers confronted change. This was all the more striking because Humla District is widely considered the least progressive of all of Nepal's districts. The data articles in this dissertation speak to the revelation that conservatism and innovation are not mutually exclusive, and that the connotations we often attach to either one obscure the mechanisms by which people cope with vulnerability. To drive this point home, I first speak to one of the ways in which a commonly used risk mitigation strategy may imbue a great deal of risk on the actor.

One day during my fieldwork in Nepal, I was walking down the path from my abode to the place in in the village where I could charge my computer, when I saw a young girl chasing after a calf that was confused and running down the wrong path toward me. I could have just stepped aside and let the girl corral her own cow, but I was so tired of feeling useless all the time, that I thought, "Hey, this is something I can do", so I stepped in the way of the cow. But instead of going the way it was supposed to, it ran in the wrong direction up a steep slope. Now, feeling like I needed to see this through, I went after it, caught it, and tried pushing it toward the girl. Not much of a livestock wrangler at home either, my way of directing cow traffic did not sit well with the calf. It turned, took a running start, and rammed me. It only rammed me in the thigh because it was that young, but I nearly fell over. By this time a small crowd had gathered and we

were all laughing, but the vindictive calf backed up, took another run, rammed me again, and just kept on ramming me until I was almost over a cliff. Finally, the mother of the girl gained her composure enough to come rescue me. From a baby cow.

In this dissertation, I write about vulnerability and risk taking from the standpoint of my debts to and admiration for the people of Humla District, Nepal. They had to feed me, teach me how to behave, and rescue me from baby cows for over a year. Some of those things I paid for with money, but money does not begin to touch most of them, and this is why: being indebted in Nepal (and, in my experience, many parts of the Global South where communal ties often provide vital risk mitigation; see Mauss 1967) means placing a social contract alongside the money. Resources are so scarce there, and conditions so harsh that villagers take on each others' debt in a loosely rotating system. They know that the one certitude is that their day will come, tomorrow most likely. Being in debt is saying, "when and if I can, I will be there for you, too". This terrified me. I did not know how I could be there for them. This study investigates the impacts of western development projects, and my observations were that they often were nearly as costly as not offering anything at all, so heading up my own NGO (the most common suggestion of Humlis) did not seem right. But I also knew that participating in an intentional, if open-ended, social contract was the absolute biggest gift I had in me. My name is Catherine Sanders, and I am in debt to the people of Nepal. I will never be able to pay it back. And I will never give up trying.

Debt is so complicated in the current American psyche because it is rife with social paradox (see also Graeber 2001). Our country is founded on notions of self-reliance that preclude fiscal dependence on others or the government. Nowhere was this clearer than at the recent Republican National Convention in Tampa, where the convention hall rang with mantras like "We built this"

and "We can change it". And yet, we pride ourselves on building more, and bigger, and stronger than anyone else. Often, this requires us to borrow from moneylenders and dig a financial hole we are not positive we will be able to leap out of. It is American to spend, but it is also immoral not to succeed.

I fear debt above anything else, because debt means *owing* someone something, or being dependent. It means that at some point in the future, I will be called upon to pay my debts. When we place our burdens on anonymous institutions instead of friends and family, debt becomes connected to shame and dependency. However, where blame is not the default, debt, it turns out, is just a promise. Further, it is evidence of our participation in the communities in which we live[1].

During my dissertation fieldwork, I observed the rotation and exchange of social and material debts as a way of managing risk in Nepal, and an implicit challenge to neoliberal concepts of risk and finances. Throughout the dissertation, this contrast between the "traditional" and the "neoliberal" remains active and shifting. In this introduction, I hope to provide a detailed context for the articles I wrote with co-author, Dr. McKay. First, I describe the conditions in the fieldsite that affected my research strategies, and also villager decision making. Next, I reveal how the methods described in my comprehensive essay played out on the ground in my attempts to measure the complicated concepts of socioeconomic status (SES), risk taking, and development. Third, I describe the burgeoning economic processes in the region as a way of foregrounding discussions of villagers' attempts to manage and respond to risk and vulnerability in the data

[1] I published a version of this introductory section in a blog post for the American Anthropological Association's page on the Huffington Post on October 17th, 2012: http://www.huffingtonpost.com/american-anthropological-association/debts-and-indebtedness-in_b_1973589.html

articles. Finally, I provide an outline of the data articles, and acknowledgment of the main contributors to this project.

Entering the Research Site

*Thakuri*s are the second-highest caste in Nepal, and the smallness of their population in Humla, along with the caste and ethnic diversity of the region, has strengthened the pride they associate with their traditional cultural station. For the past 40 years or so according to villager accounts, *Thakuri*s in Humla have been poorer than their lower-caste neighbors, due to aspects of their history, environment, and a broader cultural fabric in Nepal to be discussed later. This paradox has led to some interesting relationships between social and economic statuses in the region when villagers face the challenges associated with a rapidly developing context.

Today, the definition and content of social relationships for Humlis are changing rapidly as a result of political uncertainty, climate change, and the influence of recent political conflict and increasing numbers of development organizations in the region. My research focused on the nature of those changes and their implications for Humli vulnerability and risk-taking.

The fieldsite is located seven miles from Simikot, the district capital, in a Himalayan valley about 8,000 feet in elevation. Villagers grow two crops per year where land is available. The most important crop of the summer agricultural season is millet, of which there are three varieties. Agriculturalists in the fieldsite also intercrop amaranth, beans, turnips, potatoes, and maize on a rotating basis, and a variety of vegetables and squash, the latter of which are ideally grown in "kitchen gardens" near the house. One village, Paschimgaon[2], cultivates a cherished variety of red rice, eaten and shared at the many festivals throughout the year, and rationed

[2] Pseudonyms have been used in place of village names and surnames throughout the dissertation.

carefully by each family. The colder, spring or high-elevation summer planting consists of wheat, buckwheat, and barley varieties, because of their hardiness (see Levine 1988).

Simikot, the district capital, is a more convenient trading post for nearby villages, but with less advantageous trade terms for certain necessities than Sera, the border town in the Tibetan Autonomous Region of China. Whereas in the past, Humli *Thakuri*s used to bring grain and handmade goods to sell or exchange at trading posts (see ethnographic essay), they complain now that they only buy, using either borrowed money or grain, or cash procured elsewhere at great cost in terms of labor and travel. Reductions in the traditional salt trade and in local smallstock (sheep and goats,) due to the paving of roads in the southern parts of Nepal and the influx of the cash economy, have shifted currency-obtaining endeavors in other directions, and contributed to the sense among villagers that money only flows outwards, never in.

Our three-person research team consisted of me, Keshang Lama, the research assistant, and Chris Lombardi, my partner at the time, and a photographer who collected our remote sensing GIS data. We stayed in the middle village, Madhyagaon, at a campsite designed for the small tourism/pilgrimage industry that passes from the district capital through the village all the way to Mount Kailash and Lake Mansorovar in China, sacred for their prominent places in both Buddhist and Hindu religious traditions (Chamaria 1996: 19; Jerstad 1969: 144). At the time of our fieldwork, the tourist trade was just recovering from its recent nadir during the Maoist conflict. Between March and June, and in September and October, we often shared the campsite with entourages of tourists, pack animals, guides, cooks, and porters. In fact, we relied heavily on the porters and guides to divert their "extra" (*bainki*) food items our way, since we were desperately in need of food due to our lack of productive land, inability to access portions of a Simikot-based monthly government rice allotment, the general food insecurity in the region, and

the high costs of transporting food into the district by plane. Indeed, withstanding their productive capabilities and a meager rice allotment, most of the Humlis in the fieldsite struggled in similar ways to get enough to eat.

Madhyagaon was the newest and smallest of the three villages, having split off from Uttargaon generations previously due to population growth, according to oral histories. Of the three villages, Madhyagaon was the lowest in elevation with a combination of flat, irrigated and steeper, un-irrigated fields. Disputes over land were common due to Madhyagaon's proximity to several other villages on that side of the Karnali River. Their irrigation system had broken several years prior to our arrival, and they only invested in its recovery in 2010 when we were leaving, for reasons I revisit in the conclusion. I conducted the bulk of the research in the other villages because it would be convenient, travel-wise, to split the difference of my daily travel to the villages, make more sense in terms of sample sizes, and put less strain on our relationships in our 'home village'. Therefore, our primary contacts in the village came through our landlords and also the NGO workers who frequented a regional office there. With their help and guidance, we attended many festivals and ceremonies, bought foodstuffs and firewood, and socialized with travelers, but our research arrangements in Madhyagaon were neither systematic nor consistent. It was not long before we realized we were staying with one of the most prominent members of a dominant political party, in a highly politically polarized village. However, there were no other living arrangements presented to us, and we had to accept that only the most powerful members of the community would be able to expend the labor and material resources necessary for our upkeep (e.g. kitchen items, firewood gathering and cutting, and extra rooms for ourselves and our equipment).

Madhyagaon was also home to one of the three police stations in all of northern Humla. Policemen rotate throughout the country, and typically come to Humla from places in Nepal with more facilities and diversions. They are often bored in this, most "backward" of Nepal's regions (see Pigg 1992). As mediators of local conflict, then, they often harbor some biases, and at least once during the study, their political allegiances were in fact the cause of political turmoil in Madhyagaon. One advantage of the police presence for the villagers in the area is their relatively deep pockets and habituation to a 'city lifestyle' that combine to create revenue for local vegetable. When interviewed, the policemen from other areas of the country said that this region was the most politically polarized of any they had visited. This study of risk, innovation, and conflict explores this aspect of Humli politics in more depth in the *Human Organization* article.

From Madhyagaon, the path to Paschimgaon crosses the great Karnali River, and climbs steadily northwestward into the water-secure and water-bounded, cluster of about 65 homes that constituted the village. Uttargaon was a steep, 25-minute ascent along a slick, rocky path in the opposite direction (Figure 1). Uttargaon is home to the only secondary school in northern Humla, so villagers there receive visitors from many areas and ethnic enclaves of Humla, as well as staffing from more urban areas of Nepal. My research assistant, for instance, was from an ethnically Tibetan village three hours walking distance away, and had lived in Uttargaon while he attended the school. Throughout the dissertation, comparisons between Paschimgaon and Uttargaon reveal the varying impacts of conflict and development on Humli vulnerability.

Figure 1. Digital Globe imagery of the fieldsite, as viewed in ArcMap version 10.

As a result of a history of trans-border trade (see the ethnographic essay), the ethnically Tibetan communities just north of the fieldsite maintain many advantages in terms of livestock, efficient social organization, and political connections that contribute to their relative affluence. Although socioculturally these 'Lama' communities (the Nepali government had assigned all Tibeto-Burmese-speaking communities in northern Humla the same surname, 'Lama', for census purposes in the early 1980s, despite their differing ethnic and clan backgrounds; see Levine 1987: 80) are low status members of an "untouchable" Nepali caste because they observe Buddhist forms of religion, practice polyandry, eat cow meat, and drink alcohol (cf. Cox 1989), they are economically more successful than their Hindu-observing neighbors. Some of the *Thakuri*s in the fieldsite told a "fall from grace" story about how, 40 or so years ago, the lower caste 'Lamas' worked on their fields, begged food from them, served, and shepherded for them (*Thakuri*s). However, the ethnically Tibetan communities of Humla became wealthier because of their hard work, good business sense, and their efficient, community-oriented, traditionally

polyandrous social organization (cf. Levine 1987). With increasing population pressure on *Thakuri* lands, it was not long before *Thakuri*s had to begin working their own fields and begging work from 'Lamas' for supplementary food and other currency. Although this is a morally-laden tale that reveals as much about *Thakuri* value systems (cf. Winkler 1984: 47, 49) as historical processes, there is no doubt a seed of historical accuracy in it (see also Shrestha 1971, cited in Dahal 1973). Today, 'Lama' communities are the main lenders of cash and grain to *Thakuri*s struggling to meet their subsistence needs, and villagers from the fieldsite routinely and unidirectionally migrate to those villages in large numbers to work their fields and shepherd their animals during certain seasons of the year.

Methods Update

Chris and I arrived in Kathmandu in June of 2009, and the 6 weeks it took me to obtain my study visa provided an opportunity to acquaint myself with Nepali customs, engage in further language study, hire a research assistant, and be indoctrinated into Nepali bureaucracy. My research assistant, Keshang, was living in a community of Tibetan-origin Humli emigrants in Bouddhanath, a neighborhood of Kathmandu. Like many of the children from the 'Lama' villages of Humla, he had been sent to Kathmandu to study in order to escape conscription into the Maoist ranks during the conflict. The Tibeto-Burmese-speaking households in Humla were the only ones that could afford this coping strategy, and this was convenient, because allegedly the Maoists were harsher with these households than with Nepali-speaking communities during the conflict.

Keshang accompanied us to the district capital of Simikot in Humla District for the first time at the beginning of August, 2009. My only political connections that could help obtain a permit and government-subsidized rice for our food supply worked for one of the local NGOs

whose projects I would be investigating during research, so already I would have to jeopardize the study's validity by associating myself with the NGO. This was unavoidable, and, as it turned out, did not matter, because the villagers would have automatically associated me with a NGO because I was a *bideshi* (foreigner). Especially at the beginning of our stay, Keshang and I prefaced every conversation (not just interviews) with the IRB-approved spiel on my associations and commitments, and eventually, word spread that I was a student, not a NGO worker. Still, most villagers assumed I knew and was friends with all the other *bideshi* that came through the fieldsite that year, so there was some inevitable bias to what villagers told me about how they felt about the technologies they were adopting.

The only way to confront this bias was to observe Humlis using the technologies (e.g. cooking on the stove, or doing work by solar light) without subjects knowing I was there to observe and evaluate their usage. This was at first difficult, because most of my interactions with villagers occurred away from the hearth on the rooftops of homes where Humlis typically socialize, so we began making up excuses to come inside to do interviews. In addition, in the interim between the second and third seasonal surveys, I began having homestays at villagers' houses, so I was present for dinner/breakfast preparation at 16 homes, and observed cooking practices at 61 additional households, over half of the households in the fieldsite, during this time.

Season One: Harvest

During August, September, and October of 2009, I participated in festivals and agricultural tasks, and spent each day in either Paschimgaon or Uttargaon, getting to know the villagers and familiarizing myself with the dialect and customs of the *Thakuris*. During this time, I used a GPS to map the locations of households, had conversations and participated in

agricultural tasks with villagers, conducted five focus groups that investigated general views of socioeconomic status, development, and the impacts of the Maoist conflict, and piloted the first seasonal survey I had constructed (see methods essay). It was during this time I also realized how difficult it may be to interview a male and female household head from each household, due to the more-or-less constant travel villagers undertook outside of the village.

During late October and into December, Keshang and I together conducted the first semi-structured seasonal survey, interviewing a representative (in terms of gender, socioeconomic status, and household size) 55 percent sample of households (n=71) in Paschimgaon and Uttargaon. Each interview lasted one-to-two hours, and consisted of the following domains, pertaining to the five-capitals approach (DFID 2000): 1) Overall perceptions of SES and change processes over the last generation (since the transition to parliamentary democracy in 1991) 2) Human capital: household census, including the parity, marriage length, inheritance/partition status, and marriage history of each couple, the education status, gender, age, and past month's sickness history of each individual, kinship and migratory statuses of present and absent members of the household, and recall of the interviewee's time allocation over the past 48 hours; 3) Physical capital: Field size, food security overall and from production in the past year, crop yields (in kilos, if possible), seed procurement strategy, and livestock types, numbers, and recent livestock trends; 4) Financial capital: Number and kind of income sources in the past year, income source trends over the past generation, last month's household expenses, last month's household income, and current and past debts and debt repayment strategies; 5) Natural capital: livestock grazing access and practices, firewood procurement (amount and time investment), water source information, and perceived changes in precipitation and water availability over the past generation; 6) Social capital: labor exchanges, small-quantity barter practices, number of

households this one is related to in and near the village, preferences for friendships versus family members, and political and business connections at the district level; 7) technology adoption: lead adopter gender and age, reasons for adopting, household discussions about, and problems with adoption of stoves, lights, toileting systems, greenhouses, timber saws, and radios; and, 8) conflict experiences: gender, age, household and individual reasoning, and duration of terms for household members who by choice or by force were compelled to aid the Maoists during the conflict. It was during this first seasonal survey that the Namaste phone corporation built a cell tower on the hillside between Madhyagaon and Uttargaon, so we incorporated adoption of cell phones into our second and third seasonal survey technology adoption sections.

Gathering Supplies: Kathmandu

At the beginning of January, the research team returned to Kathmandu so that I could enter and analyze data, submit an interim report to the NSF, re-design the general and seasonal surveys, and re-supply our team with the grains, spices, coffee, and peanut butter we could not obtain in Humla District. We also bought gifts to compensate for people's time during the interviews. For the first season, we had given interviewees 100 Nepali rupees (about 70 cents) per interview, which is about one-quarter of a daily wage for manual labor in Humla. However, this transaction proved alienating for most interviewees. To pay someone for hosting a guest as per their social/religious obligation, or *dharma*, was somewhat offensive and not conducive to establishing a rapport. Besides, many villagers expressed how cumbersome cash is in Humla, and it is almost always exchanged for food and other basic materials, so better to just get the materials and not have to expend energy converting cash into usable goods. We bought toothbrushes and socks in Kathmandu to distribute after interviews, and villagers were much more receptive to this compensation.

We also developed the photos Chris had been taking of villagers, and distributed them during the second season interviews upon our return to Humla at the beginning of February. For many villagers, the photographs meant more than anything else we brought. Many villagers had never seen themselves at all, but they *had* seen many tourists come through taking pictures. The *Thakuri*s were very suspicious of photography and its power to capture images, and especially, their own inability to control the composition and distribution of those images. They assumed that tourists were going home and making money off the photographs they had taken of Humli people, homes, and landscapes. Chris' photographs were therefore themselves a rare opportunity for Humlis to direct the composition of and possess something that the rich *bideshis* possessed, and to control the products of visual capturing (see also Ruby 2005: 162-3).

Season Two: The Spring "Hunger" Season

We conducted 121 semi-structured survey interviews in the spring when the passes were not yet open and more villagers were at home. For the households in which I had not yet conducted a survey, Keshang and I administered a very similar version of the survey as in season one, but administered an abbreviated version (30-60 minutes) using only seasonally-influenced indicators to households we had already visited once. After the second season of interviews, I began my homestays. Keshang and sometimes Chris would accompany me to the designated home in the evening and we conducted key interviews about hunger, notions of health, and of *dharma* and community. Keshang would help explain the plan and set up a different home for me to have breakfast in, and then he went home for the evening. This gave me an opportunity to improve my Nepali, witness the use of latrine, lighting, and stove technologies, and develop a more personal rapport with villagers, who usually appreciated my willingness to be their guest and eat their food. I brought grains to trade for the food they gave me, and gave them some of the

socks and toothbrushes we had brought. Unfortunately, the homestays often made me ill, because the villagers rarely boiled their water and I was unwilling to refuse their food and drink, so we were unable to conduct as many homestays as we had hoped (n=16).

Rice Planting

In May, the highly ritualized red rice planting occurred in Paschimgaon, and offered us an opportunity to directly observe social exchanges and obligations. Rice planting requires cooperation in terms of both male and female labor specializations, and in Paschimgaon, labor groups and the planting schedule were organized around kinship. At the beginning of the season, representatives of each kinship lineage decided what days they would plough and plant the paddies using a randomized method of selection involving the tossing of a stick. On those days, the members of the lineage hosted all the friends who provided labor. They served them *puris,* milk, red rice, and other of the sweetest and rarest foods available, and then everyone went down to the fields. The men used the *dzopa* (yak-cow crossbreeds) to smooth the mud in the paddies, and then the women planted the fields as though in a race (or it seemed that way to me as my clumsy hands and feet attempted to keep apace the rapidly moving line of women; see Figure 2). The young unmarried women were dressed in full ceremonial regalia with their brightest-colored clothing, shiniest jewelry, and largest *tikas* (a mark of blessing on the forehead using dye, rice, and water), because rice-planting was a time when eligible *Thakuri* men came from other districts to court potential wives.

Figure 2. Contrasting images of the rice planting in Humla. Photography by Chris Lombardi.

Soil Sampling and Anthropologist Blunders

Due to the prevalence of observed disability in Paschimgaon, I also wanted to conduct soil testing in order to see whether there might be an iodine deficiency in that village. I had contacted a soil scientist in Kathmandu who could run the tests for us when we returned. In focus groups in Humla, using a poster-size panoramic photograph Chris had taken of each village, we had villagers identify the overall best-quality and worst-quality agricultural land in the fieldsite. During interviews, villagers had begun identifying their household's landownings on a duplicate of the same panoramic photograph, so we were able to identify households from whose plots we might want to take soil samples in order to representatively test soil nutrients. After making a list of such households, we went to them to seek permission to take a handful of soil, explaining our reasons for doing so and how it would work.

Figure 3. Keshang makes not of villagers' field locations on the panoramic photograph. Photography by Chris Lombardi.

A lot of household members, especially young men, were excited about learning more about their soil, so they granted us permission eagerly, provided we apprise them of the results. Other people, especially when we asked older women in Paschimgaon, were reluctant, and we did not press the issue. Next, we began collecting the soil samples from the fields for which we had been given permission. This turned out to be a very visible endeavor, because everyone spends so much time out in the fields, and it attracted a lot of negative attention in Paschimgaon. The next day, when we went to Paschimgaon village proper, a woman and a small crowd on one of the roofs began shouting obscenities at us, enraged about the soil sampling. Taken aback, I approached the woman and Keshang facilitated a conversation about the soil. I tried to explain that I had only taken soil from the fields of people who had given me permission, but she said it did not matter. By removing soil, we were taking God, and all of Paschimgaon's fields and productivity would be cursed because of it. I asked what I could do to prevent this and she

replied that there was nothing I could do at this point. Regardless, I decided to return all the soil samples to the proper owners in both villages.

Intriguingly, there was no such outcry in Uttargaon, and when I arrived to return their field samples and explain myself, Uttargaon villagers simply shrugged, bemused. In Paschimgaon returns, the wives of men who had granted us permission thanked us profusely and said that there may have been trouble if we had not returned the samples. Over several days we had many discussions with Paschimgaon villagers about soil sampling. Schoolgirls threatened us on their way to school, but young men told us the women were just old-fashioned and that we should take the soil anyway, it was none of their business. This offered an opportunity to discuss narratives of change in light of the soil fiasco. One afternoon during this time, we sat on a rooftop in Paschimgaon with a group of men, explaining what had happened with the soil in our usual preface to all village interactions over the past few days. By this time, most villagers understood what had happened, and we were able to discuss the beliefs behind the uproar. The men said that certain villagers, especially the women, felt that when the tourists began arriving in higher numbers in the 1990s, agricultural productivity and certain species of animals had started disappearing. As it happened, these were the types of things villagers saw tourists taking pictures of. Some concluded that the photography had caused the declines in food availability Humlis were increasingly experiencing. I asked whether Chris' photography was believed to have this effect, but the men said that, because we had distributed the photos to the villagers, it did not have a detrimental effect.

Meanwhile, Chris had returned to Kathmandu on his way back to the US, and developed and sent a second set of photographs. As we distributed these to villagers, the talk of soil sampling came to an abrupt halt and never came up again. Needless to say, this was an eye-

opening experience in terms of understanding the factors involved in conservatism and understandings of change in the fieldsite (cf. Fisher and Arce 2000).

Season Three: Observing Trade

Amid the third (summer season) surveys (n=101), I joined a caravan from Uttargaon on its way to China to procure household goods. With five men in addition to me, and 14 dzopas and horses, we traveled the four days it takes animals to get to the Chinese border (with humans alone it only takes two). Only one of the men crossed the border to trade in Sera, while the others conducted their business on the Nepal side in Hilsa, business that seemed to be entirely reliant on negotiated credit and lack of cash. They visited the shops run by Uttargaon and Madhyagaon emigrants to obtain cheap clothes for their children, shoes, flour, tarps (for use in summer grazing shelters), and other household goods, and then turned back home.

Figure 4. A Madhyagaon shopkeeper and Uttargaon client pose for a photograph in Hilsa.

Also during the final phase of the fieldwork, I undertook unstructured interviews in the district capital with NGO workers from the five most active NGOs in the fieldsite to get their views on villager attitudes, the successes and failures of their projects, the extent of their

collaboration with governmental and other non-governmental organizations, and the overall context of development in Humla District.

Data Entry and Analysis

I returned to Kathmandu at the end of August, and left for the US in September, at which point I began entering and analyzing the data in earnest. Because most of my records were handwritten and in hard copy due to the lack of reliable electricity available in my home in Humla during fieldwork, I was unable to use NVivo to code and analyze ethnographic fieldnotes, and instead coded and analyzed them manually (Bernard 2011). I entered the structured portions of the surveys in IBM SPSS 19, and then version 20, and began the analyses proposed in my methods essay. Multiple regressions proved difficult due to the interactive nature of the socioeconomic status indicators, so I relied instead on T-tests and non-parametric statistics to guide my analysis. A principal components analysis highlighted which indicators of the "five capitals" contributed the most to villager designations of SES (cf. Jackson 1991; Rauniyar and Goode 1992). First, a households' education level per person (human capital), their cash income during 2009 (financial capital), number of large livestock (physical capital), and finally, number of nearby kin (social capital) captured the largest percentage (25%) of variability in villager-defined SES, in that order. I calculated a composite measure of SES based on those indicators weighted according to villager responses to the question, "what is your household's most important resource?", to use in analyses associating SES with decision making about the conflict and technologies (Bernard 2011).

Technology adoption, as a measure of a household's level of engagement with development initiatives, was best captured by an aggregate indicator of the total number of technologies adopted per household. Then, using a Guttman Scale (Bernard 2011: 321-6), I

determined that the aggregate indicator of technology adoption was a unidimensional variable whereby households were 91% likely to adopt technologies in the following order: stoves, then latrines, then phones, then radios, then saws, then greenhouses (although it is likely that phones and greenhouses only existed so low on the list because they were the most newly available technologies, and by now they have, in all likelihood, surpassed even stoves on the list due to their popularity).

In the spring of 2011, in conjunction with my work for the ISIS Foundation and Kimber McKay on lived experiences of poverty, I began working with Matthew Nordhagen, a GIS specialist, to learn how to use and to adapt the GIS data Chris had collected to ArcMap v. 10. First we entered the household locations so they appeared on the map, and then we began connecting households to their fields using Arc's polygon tool and information recorded on the panoramic photographs to guide digitization. This allowed us to measure each household's field size more accurately and compare field sizes between villages and among higher and lower status households. After several tries, we decided the ArcMap data management tool called "XY-to-line" was the ideal tool with which to measure and record the as-the-crow-flies distances between households and their fields, so that eventually we constructed a database with each household's total field size and average distance to fields within each level of soil quality (as designated by the villagers in the fieldsite).

We also used the XY-to-line tool to record the patterns of kinship for each village in the fieldsite. From the semi-structured survey data, I extracted kinship and lineage data and formatted it so each relationship formed a case row with geospatial information attached. After using the XY-to-line tool, I observed the emergence of different patterns for both villages, and measured and compared the distances between related households in the fieldsite. These analyses

provided invaluable information about social networks and their relationship to development and conflict in Humla. The XY-to-line tool revealed important patterns of healthcare seeking as well. Combined with the geographic imagery, this information contextualized and helped clarify the differences between the villages compared in the study. To our knowledge, no other studies are using GIS in this way, and our project is generating interest among anthropologists as well as Arc experts.

Economic Enterprises

Socioeconomic status is a complicated concept in Humla District, and each of the data articles describes various components of SES that impact change processes in Humla and other parts of the world. Here, I describe some of the economic endeavors contributing to SES that pick up where my ethnographic essay left off prior to fieldwork. Except for those members of households that still participate in the southern trade route (i.e. the few households that continue to maintain larger numbers of sheep and goats), family members are all home only during the summer harvest period in October and November. In the spring, after the snow melts and the wheat fields have been plowed, members of each family with their animals (*dzopas*, *dzumas*, horses, cows, sheep, and goats) form caravans and travel to China, India, or high Humli mountains in search of pastures, business opportunities, and household goods such as clothes, shoes, salt, soap, cooking oil, white rice, and white wheat flour. Women accompany men on these journeys to look after the animals, but they rarely go without men, for *Thakuri* tradition dictates that females not be seen "outside" or *bahira* (see Cameron 1995: 227 on *Thakuri* female roles; Winkler 1984: 47 on *adheka* tradition).

The geopolitical and economic dynamics in the region have increased the number of opportunities for non-agricultural subsistence. Non-governmental organizations and government progenitors of development usually offer cash to villagers in return for their labor on village projects, even if that work is for the villagers' sole benefit. Although these projects are irregular and the remuneration is modest, villagers have come to rely on the work projects to finance some of their monthly household needs. Various activities for which villagers might be paid include: repairing irrigation and micro-hydro canals, cleaning temple sites, planting orchards, building fences to keep animals out of those orchards, constructing spring-fed tap water systems, repairing bridges washed out by landslides or flooding, and carrying pipes and tin from Simikot to their own villages, *et cetera*. But the main source of food and cash derived from 'development' comes from manual labor on the motor road that will one day, supposedly, connect the district capital to China, potentially opening up markets for local income earning (cf. Brown 2003). Mostly men do road work, and they are paid by the World Food Program with white rice from Korea, Japan, the US and other donor countries, or in cash. When asked what they would do if the road project, in-progress for the past 14 years and nowhere near completion at the end of my fieldwork in the fall of 2010, were to be successfully completed and payment for labor halted, many villagers answered, *maryau* (we would die). Between 2009 and 2010, road work ranked highest among households' main sources of income, with 37 households (33%) relying on this resource to supplement decreasing agricultural yields.

In recent years, some *Thakuri* men have followed suit of their Buddhist neighbors and entered the wooden bowl (khaatko phuru) business. They travel to India or far-away parts of Humla where they can find Maple trees that were once widely available in nearby parts of Humla. There, they carve out the knots from trees and return to northern Humla, where they pay

skilled, ethnically Tibetan Humlis to carve and shape the bowls. Since *Thakuri*s are new to the market, they will often relinquish their bowls to 'Lama' traders for a much lower price than they could get for finished bowls in China, between 200 and 400 rupees per bowl. If particularly ambitious, though, they may expend the time and animals for the trek to the Tibetan Plateau, where there are few trees of any kind and these bowls are highly prized for their everyday use as well as Buddhist ceremonial importance. There, finished bowls may sell for as much as 110,000 Nepali rupees (personal communication, Keshang Lama, 15 February, 2012), enough to feed, clothe, and school a *Thakuri* family for three-to-six months. During 2009 and 2010, only nine households named the wooden bowl business as their main source of outside income. The market for wooden bowls fluctuates to a large enough extent that many *Thakuri*s active in the wooden bowl trade may abandon it in a given year, turning to herb-cutting or investing in agriculture instead. Because the market for *satuwa*, an herb indigenous to the upper elevations in Humla, had reputedly expanded during 2010, many Humli men changed their minds about the wooden bowl trade at the last minute and plied herbs instead.

Figure 5. Keshang looks on as a Paschimgaon man sorts the *phuru* for sale in China. Photography by Chris Lombardi.

Harvesting mushrooms or herbs for sale in India and China is an increasingly lucrative alternative to the salt trade, given the nature of global bioprospecting and prized herbal commodities in today's pharmaceutical and herbal drug trades (cf. Olsen and Bhattarai 2005). Humli villagers climb to extremely high elevations in order to cut herbs in the spring and summer months. Some of these herbs are restricted by government mandate, but the restrictions fluctuate depending on political dynamics (e.g. government officials had difficulty enforcing restrictions during the Maoist conflict), so Humlis prefer to stay within the confines of the law if at all possible. Government regulations impose a fine on the cutting of certain herbs, but if Humlis are cutting on land claimed by another village, they also pay tribute to that village for the privilege. In addition to fluctuations in restrictions, the herb market itself experiences great vicissitudes, so Humlis in the fieldsite coordinate along long-distance communication channels about the nature of the various markets. Recently, with the arrival in 2009 of the first cell tower providing access to phone communication from the fieldsite, such decisions became much more responsive to market trends. During fieldwork, 12 households (11%) relied on the herb trade for their main source of income.

Construction is also booming in Humla these days, not just due to population growth and partitioning households, but also because the 'Lama-style' houses are becoming an important status symbol even in the Hindu-observing community of northern Humla. Few households own the large saws needed for hewing timber (Figure 6), however, so investment in construction skillsets and equipment can pay off over relatively short periods. Timber restrictions during and just after the conflict were also fluid, providing Humlis in the fieldsite a temporary window of opportunity for earning income from construction. Other skilled occupations in Humla include the coveted governmental postal position, work with non-governmental / government health

clinics, or other NGO labor, jobs that typically pay far in excess of the mean income for other households in the region, but often demand longer-than-typical/ specialized educational training unavailable locally. 14 households (12%) in the fieldsite benefitted primarily from skilled work during 2009 and 2010.

Figure 6. Few households own the large, timber-hewing saws. Photography by Chris Lombardi.

Other business opportunities in Humla include small shops in the storage area of a home stocked with Chinese whisky, soap, the Nepali and Chinese equivalents of Ramen noodles (*chau chau*), and cooking oil; pack animal rentals to households who cannot afford their own large animal; load carrying for the wealthier ethnic Tibetans or non-governmental organizations; or, selling firewood to an increasingly treeless Simikot. This class of income-earning can be loosely construed as "transport" and counted as the main income source for another 14 households in the fieldsite during 2009 and 2010. Although lumped together for descriptive analysis, local people imbue each type of transport with varying levels of value, and carrying loads on one's back constitutes the least desirable, most humiliating form of income- earning for a majority of the households in the fieldsite (see also Pigg 1992).

While many young men were trying to break into the tourism business by building teashops and attending training programs for guides and teashop owners, few have been successful. Few *Thakuri*s in Humla speak any English whatsoever, a problem not just because of their need to interact with foreign tourists in this line of work, but because most of the trainings are conducted by foreigners in English. Also, the Humli teashops have a long way to go to attain the level of elegance competitive for the kinds of tourists rich enough to afford to come all the way out to Humla by chartered plane or helicopter. Nor does Humla offer the kinds of natural attractions necessary to lure such tourists in large numbers. Most of the guides and porters are hired ahead of time in Kathmandu by the large tourism offices based there and through which the majority of tourists contract. In addition, Humla porters are notorious for their incessant haggling, laziness, and inconsistency. The less-educated, comparatively unconnected *Thakuri*s cannot presently compete with their more sophisticated, politically saavy, and relatively wealthier, Buddhist-observing neighbors. Finally, the two villages in the fieldsite are located a short distance from the main pathway and are at a disadvantage in the tourism business compared to their path-dwelling neighbors, at least until the motor road that will run through Uttargaon is ready.

The least-desired business opportunities in the fieldsite include: again, portering materials for others, working for 'Lamas' as shepherds , or helping them plant, plow, or harvest in exchange for pay. Although *dharma* was invoked to explain valued risk mitigating social obligations such as being generous and taking care of those less fortunate (cf. Winkler 1984: 47), the *Thakuri*s of northern Humla also mentioned *dharma* when referring to ideas about self-sufficiency and the pride involved in the ability to do one's "own work" (*aphno kaam*), as opposed to hiring people to do it for them (cf. Winkler 1984: 47) or working other people's land

for a small share of the yields. *Aphno kaam* implies humiliation and the ill-repute that accompanies failure to take care of one's own.

However, these *Thakuri* villagers have also begun listing agricultural work among their least favorite productive activities. The reasons for this among a segment of the population are explored throughout the data articles, but villager narratives also described: decreased yields and increasing labor demands due to climate change; deforestation, erosion, crop diseases, mono-cropping and/or intensity of land use, as well as increasing distances to fields resulting from successive re-partitioning of household plots; and perhaps most importantly, modernizing influences. Food insecurity also continues to intensify and is the main concern of most Humli villagers, despite increasing opportunities for earning cash and obtaining seeds. The winter months are 'hungry times' for most of the Hindu-observing villagers in northern Humla, a time when planes rarely fly into the Simikot airstrip carrying "government rice" for cheap disbursement (McKay 2002), when the summer harvest is long gone, and when travel outside for business opportunities is nearly impossible due to snow in the high Himalayan passes. Especially for men, however, labor demands are much lower during this time (women still bring firewood from the forest for daily use and carry loads of manure and compost to their fields in preparation for summer plowing), perhaps accounting for the overall insignificance of seasonal changes in male health throughout the study year.

Data Article Outline

Briefly, the dissertation's data articles describe, analyze, and discuss the implications of: 1) contexts of healthcare seeking amid these rapid development influences in Humla District (*Technology & Innovation*); 2) decision making in terms of conflict participation in the fieldsite (*Cultural Anthropology*); and, 3) interactions among social networks, development

organizations, and political movements in the region (*Human Organization*). Together, they paint a picture of Humla as a rapidly developing region that will indeed encounter a new set of health and livelihood vulnerabilities in the coming years.

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The Historical and Geographical Contours of Humla District, Nepal: An Ethnographic Essay

INTRODUCTION

An attempt to draw immovable lines denoting historically, culturally, politically or ecologically mutually exclusive regions in the Himalayas is complicated by the region's heterogeneity, ecological dynamism and the resultant effects on human populations (Orlove and Guillet 1985). Therefore, analyses of South Asian contexts must suffice to respond to research demands as well as the existing literature in specifying a geographical area of pertinence. Because my research focuses on the choices people make in response to a changing socio-political and biological environment conscribing human activity in particular ways, I have identified a region united by common ecological features (e.g. altitude and latitude) as well as, to some extent, a connected political economic and socio-cultural history. This essay is biased toward the elements Humla District, Nepal shares with the surrounding South Asian context. The Himalayas are a region of great biological and cultural variability which I hope, in part, to adequately express in the following pages. However, out of necessity many hues of life and livelihood in the Himalayas are glossed or left out of this essay.

In the next pages, I will provide an overview of the contexts of innovation diffusion in two villages of Humla District, Nepal by examining ethnographic contributions to knowledge about human variation in the Nepal and South Asian Himalayas. Analysis will address northwestern Nepal's connectivity to the Himalayas, South Asia and other mountain regions. Drawing from ethnographies engaged with decision-making in this region, this paper will examine the social and historical contexts and characteristics of technological innovation in the South Asian Himalayas, and specifically, in the Karnali zone of northwest Nepal. Following a

review tracing historical processes in the region to current development and political orientations, it will attend to adaptation, risk perception and decision-making among people of South Asia and Humla District. Finally, I will relate the contributions to this broader literature a study of responses to innovation in Humla District, Nepal allows.

HISTORICAL BACKGROUND

Scholars variably define the Himalayan region's geographical borders as a subset of: the mountainous regions from the Hindu Kush and Pamir mountains in Afghanistan and Tajikistan, inclusive of the Karakorum Mountains of Pakistan and the Kumaoun and Garwhal Himalayas of India, crossing Nepal to the eastern border and into Myanmar and Yunnan, China, and stretching north to south from Mongolia across the Tarim Basin into China and finally, Nepal and Bhutan (Bishop 1990; Ives 2004; Orlove and Guillet 1985). The Himalayas of South Asia are thus characterized by criss-crossing political borders, a diversity of geological and ecological niches, and drastic fluctuations in altitude and latitude and resulting climates, resulting in a heightened flexibility and variety with which people must carry out their livelihoods in this part of the world (Bishop 1990; Furer-Haimendorf 1975; Ives 2004). South Asian as well as Himalayan scholars tend to focus their research on Nepal for geopolitical reasons, as well as because of the immensity of geographical and cultural information available in this region of the Himalayas for investigating questions of human variation (Fricke 1989). The Karnali region of northwest Nepal is one shaped by common historical and ecological processes, where Hindu and Buddhist peoples' lives abut and intermingle across ethnic lines, and in which subsistence cannot depend solely on the agricultural prowess of inhabitants due to the harsh ecology of mountain environments. Historical processes in the Kumaoan and Garwhal Himalayas in India, the area from the northern Nepal border to and encompassing the Tibetan Plateau, and the Himalayan

region to the east of Humla most directly impact the Karnali zone, but influences also include parts of the broader Himalayan region with historical relationships linked to these mentioned zones. Trade relationships connect these regions to the lowlands outside of the Himalayas, and trade patterns were in some cases set in motion hundreds of years ago. This region has also been shaped by similar political, environmental and social changes in recent times. In the following sections, I will provide a historical overview of the broader region before focusing on the contexts of people's lives since Nepal became a state.

Extant Historical Processes throughout the Himalayas

Although historical data is lacking to inform our knowledge of the South Asian Himalayas in the era pre-dating the fourteenth century, it is believed that the settlement of northwestern Nepal, the Kumaon and Garwhal Himalayas of India, and western Tibet was subject to processes set in place as a result of the interactions between a number of petty kingdoms vying for power and territory in the broader Himalayan region. Mongoloid groups are thought to have lived in the region between 2000 BC and 700 AD, and a wave of Tibetans probably arrived in the region sometime in the seventh century, spreading east and west throughout the Nepal Himalayas and engaging in trade and pastoralism there (Shrestha and Bhattarai 2003, Frenchette 2004; Zurick 1989). A Tibeto-Burmese-speaking Magar king ruled the Karnali and Gandaki regions of Nepal from the eighth century to the twelfth, whereafter the Khas invaded and incorporated this kingdom into that of the multi-ethnic Khas dynasty (Zurick 1989). The Tibeto-Burmese Kirati tribe in the region was likewise integrated into that dynasty (Bishop 1990). *Bhotia* is a term used in the Nepal Himalayas to describe Nepalis of Tibetan origin who practice Buddhism, and is differentiated from Tibeto-Burmese-speaking people of

Mongoloid origin who practiced tribal religions, like the Kirati and Magar, though they may practice these in combination with Buddhist or Hindu religious forms (Furer-Haimendorf 1966). The incorporation of Kirati and Magar into the Khas dynasty was an early rendition of the ethnic and cultural permeability that influenced the people of northwestern Nepal's innovative decisions for many years.

The Khas Dynasty

The Khas, believed to originate in the Hindu Kush, were an Aryan warrior tribe speaking a language related to ancient Sanskrit but eschewing the customs and taboos associated with traditional Hindu religious beliefs (Berreman 1963: 15-16, citing Grierson 1916). Their progression southwest across the Himalayan region between 1000 and 800 BC left indelible marks on the political and ethnic landscape of the western Himalayas (Bishop 1990). As they proceeded eastward, and until Muslim invasion weakened their power throughout northern India, the Khas incorporated mostly Hindu people, forcing many Buddhist groups to migrate from the Gangetic plains in India. Their march eastward resulted in the increasing Hinduization of the Khas and others in the plains regions, while many of the Buddhist refugees fled to western Nepal. The great ethnic and religious variation among Khas people at higher elevations because of their contact with people at the peripheries of many petty kingdoms of the lower Himalayas is one of the defining features of the area known as the Karnali zone in western Nepal (Berreman 1963; Bishop 1990).

By the time the Khas-origin Katyuri came to control what is now northwestern Nepal, western Tibet and the Indian Himalayas in the 9^{th}-11^{th} centuries AD, that region lay precipitously at the borders of anti-Buddhist Khas and Gupta rulers to the west, Hun and Tibetan militarist societies to the west and north, and the shamanist and Buddhist-tolerating Licchavi dynasty in

the Kathmandu Valley to the east (Bishop 1990; Bista 1991; Furer-Haimendorf 1975). The Gurjuras, pastoralists and warriors who had invaded India in the sixth century emerged from this period of upheaval bisected and re-enveloped, having been incorporated dually. The pastoralists became part of the Khas tribe at higher elevations, and the warriors part of the powerful Rajput dynasty. The latter was to solidify caste society and control Rajputana on the Indian plains (Bishop 1990). Later in the fourteenth century, the Rajputs encroached into western Nepal, ancestors of the Thakuris who remain a strong presence in the region to this day (Zurick 1989). The ethnic composition of the northwestern region of Nepal was thus shaped predominantly by political fluctuations which caused oppressed members of many societies from what is now India and China to flee their oppressors and seek refuge in Nepal's Himalayan regions, where political force could not be exerted so uniformly or with as great intensity as at the lower elevations or at the centers of power (Berreman 1963; Bishop 1990; Zurick 1989). Religion seems to be the mechanism by which many of these early Humlis were divided. During this time of petty kingdom warfare, Muslims, Buddhists and Hindu people came into contact with each other as the result of political upheaval throughout the Himalayas, alternately reinforcing and merging religious and ethnic boundaries according to political and economic dynamics affecting trade and settlement.

The Khas-Malla Empire

During the twelfth through fourteenth centuries, the region spanning parts of modern Nepal, China and India had benefited from the waning of power in surrounding kingdoms, and emerged for the first time at the center of power, as the Khas-Malla empire. Although arguable in what region this dynasty first emerged, the formation of the Khas-Mallas stemmed from the unification of parts of the Gurjura and Katyuri-Khas territories with Tibetan kingdoms of Guge

and Purang, and probably Ladakh. It thus supported both Buddhist and Hindu religious adherents, although Hinduism became increasingly dominant as immigration of Brahmans (high-cast Hindus) from Hindu-dominated areas of India increased in proportion to the intensity of Muslim invasion in that region. The Khas culture absorbed Mongolian Kirati and Magar tribes, and ultimately, although noted for their religious tolerance, the Khas allowed the Hindu caste system to dominate. As a result of incorporating so many Hindi people into the empire, elite members of the Khas dynasty in Nepal benefited from taking on caste identities, as they became members of the Chetri, or even of the higher Thakuri and Bahun/ Brahman castes (Bishop 1990: 80; Furer-Haimendorf 1966, 1975; Levine 1988a; Tucci 1962). Even now, the extent to which Humlis can claim high-caste Hindu identities determines their power to influence people in other groups (Furer-Haimendorf 1975).

The Khas-Mallas' influence extended beyond social organization and religion. They constructed roads linking northwestern Nepal, western Tibet, Purang and the Indian plains and enabling extended trade throughout the region (Furer-Haimendorf 1975). By the fourteenth century, the empire ranged from the edge of Pokhara outside the Kathmandu Valley in the east to the Garwhal Himalayas of India in the west (Berreman 1963; Bishop 1990; Zurick 1989). The home of *pahari* culture, this dynasty is said to have brought the Karnali region of Nepal and its surrounding areas to the highest standard of living before or since, and provided the seed for the Nepali language, feudal land tenure and the unique version of the caste system in Nepal (Bishop 1990; Furer-Haimendorf 1975). While *pahari* culture was predominantly dependent on agriculture, the Tibetan-origin Bhotia tribes in the highlands of the Khas-Malla region engaged in nomadic pastoralism and traded with the *paharis* of the lowlands (Berreman 1963: 18; Bishop 1990: 78). Due to the lack of valuable raw resources within the empire, the Khas Mallas' power

was contingent on the control and maintenance of trade routes throughout their territory. To achieve it, they integrated non-Khas Bhotia traders with a social and economic flexibility absent in the caste delineations and tax policies to the west in Kumaon (Bishop 1990). Accommodation of a multi-ethnic population required that the caste system in Nepal, unlike stricter forms elsewhere, be based as much on clan as inherited caste organization (Bishop 1990; Furer-Haimendorf 1966). The Matwali Chetri caste embodies this hybridization of clan and caste, assigned to ethnic and tribal populations who may have originated in India, China, or Mongolia, who may practice any combination of tribal, Buddhist and Hindu rituals, and whose behaviors are an economically-necessitated compromise of the mandates accorded purity and pollution in Hindu societies (Bishop 1990; Furer-Haimendorf 1966: 18; 1975: 234-5). Altitude often confers the degree of religious hybridization in the Himalayas, with Buddhism practiced at higher elevations and Hinduism at lower elevations, and various degrees of mixed Hindu, Buddhist and tribal religions practiced in-between (Bishop 1990: 101).

The Kalial Dynasty

During the fifteenth to eighteenth centuries, small-kingdom warfare continued to characterize the entire Himalayan region (Bishop 1990). When the Khas-Malla dynasty dissolved in the fourteenth century as a result, it splintered into the loose conglomeration of 22 Baisi and parts of 24 Chaubaisi principalities to the east. The Thakuri Kalial clan emerged at the beginning of the fifteenth century to control these principalities, including the once-Khas-Malla capitol in Jumla District of northwest Nepal. The northern and southern regions of the Khas-Malla empire ultimately fell to other groups (Bishop 1990; Furer-Haimendorf 1975; Karki 2002; Levine 1988a). A reduction in power and territory meant that Kalial kings also concentrated a great deal of effort on controlling trans-Himalayan trade. Unlike their Khas-Malla predecessors who found

flexible stratification a more promising strategy amidst scarce reources, the Kalial rulers intensified social stratification and religious prejudice. Population pressure led to frequent land partitioning and increasing scarcity, which aided in the entropic diffusion of Kalial power throughout the kingdom (Bishop 1990; Levine 1988a). Because of the fragile nature of mountain livelihoods, population pressure continues to be a concern for Humlis and their neighbors (Levine 1988a; Panter-Brick and Eggerman 1997; Subedi 2003).

During this time of heightened Bhotia oppression, shamanic *dhamis* became instruments for religious resistance as they created new forms of social solidarity and religious pluralism (Bishop 1990). This pluralism of religious and cultural behavior remains characteristic of the Karnali and broader Himalayan region today (Bishop 1990; McKay 2002; Nichter 1996). The Kalials struggled to keep power in northwestern Nepal until the Gorkha armies took control twenty years after the unification of Nepal in 1769 (Furer-Haimendorf 1975: 225; Levine 1988a: 26). After that, the northwestern portion of Nepal looked to eastern centers of power as their primary political influences, reversing the political trends resulting from the eastward sweep of Hindu people and principalities throughout the 8th through 14th centuries.

Today, Hindu people are a decisive majority in Nepal, although a multitude of ethnic categories cut across religious ones in South Asia, relegating religion among the heritage components which include national and regional political identities and kin relationships (Clarke 1995; Mathur 2000). Ethnically Tibetan Buddhists are a significant population throughout China, India, and Nepal, and form differing identities according to the constraints and opportunities available to them. They are generally ranked low when incorporated into the Hindu caste hierarchy to facilitate interaction with their Hindu neighbors (Furer-Haimendorf 1966). However, differences exist among them. For example, Tibetan refugees may have access to

international networks and resources in Nepal that their equally impoverished, long-settled, ethnic counterparts do not, due to geopolitical and historical dynamics (Frenchette 2004). That Hindu and Buddhist people in this region exhibit great biological, cultural and political economic variation both, speaks for their capacity to adapt, as well as explaining the political instability that characterizes this region of the Himalayas. This paradox recognizing the advantages and disadvantages of diversity unites political economic and biocultural theories about adaptation and competition, and poses challenges to generalizing theories of mountain adaptation.

Modern Socio-Political Processes in Nepal

The Shah dynasty arose as the Gorkha rulers in the first governing power of Nepal's unification, ruling until 1846. The Rana government then ruled alongside the Shahs for almost a century as a feudal government, but was overthrown in 1951, and replaced briefly by the Nepali Congress before the Shah dynasty took back absolute control in 1960, instituting the decentralized one-party *panchayat* system of government (Bray et al 2003, Khadka 1997; Shrestha and Bhattarai 2003). Since unification, political forces have operated most intensely in the Kathmandu Valley, from which they diffuse in varying rates to the rural areas, where the highest castes incorporate themselves into the higher echelons of the current form of government (Bishop 1990; Bray et al 2003). Feudal Rana vestiges remain in the *Kamaiya* and other forms of illegal bonded labor still practiced in the outermost rural districts (Bray et al 2003; Karki 2002; Krauskopff 2007), and also in the concentration of resources and power among Nepal's higher stratas in rural areas. Partly in response to the rifts in trade negotiations with India in 1989, resulting in devastating economic conditions in Nepal, a multi-party monarchy was formed to

replace the *panchayat* system, becoming a Nepali Congress-ruled democracy in 1991 after elections (Shrestha and Bhattarai 2003).

Much of Nepal's internal politics have been guided by the prowess with which those in power have leveraged tensions between India and China. Like in the days of the Khas-Malla empire, Nepal partially makes up for its scarcity of valuable resources with control of the vital trade-paths between India and China. Nepal, as a nation, balances tensions between the two, a political game it has played with variable success since World War II (Ali 1999; Bray et al 2003; Khadka 1997, 2000). One testament to Nepal's successful maneuvering is the lack of colonial rule in its history, attributed to the insular policies of the Rana government during this critical time period (Pigg 1992). Others suggest Nepal was economically colonized by the British in the early 1900s, if not politically (Shrestha and Bhattarai 2003). It is also true that, while both China and India have grown more economically powerful over the past fifty years, a nested Nepal has borne the brunt of the conflict between the two, and in 2004 ranked 143 out of 177 countries for standard of living (ACF 2006).

In the history of this region, ecological and political economic forces set in motion events which human actors reinforced and shifted in ways still pertinent to this day in the Himalayas of Nepal, western Tibet and India. The lives of inhabitants are shaped by biological and cultural heterogeneity endemic in this and other mountain environments. Human behaviors are likewise varied, according to historical events like the ones mentioned above, hierarchical relationships of power, and the shifting opportunities presented by the diverse but fragile resource base of the Himalayas. The synthesis of religious and ethnic memberships here is unique among world regions, especially given the rigidity of the caste hierarchy in which it is found, and sets the stage

for the types of decisions inhabitants can and must negotiate as they weigh cost, benefit and meaning in a changing environment.

LIVELIHOODS & DEVELOPMENT: DECISION-MAKING AND ADAPTATION IN THE HIMALAYAS

The dynamics affecting this region of the Himalayas have shifted since the days of tribal kingdoms and their volatile borders, as the rise of nation-states has brought outlying mountain kingdoms under the jurisdiction of urban centers far away. The Himalayas of northwest Nepal, for instance, now share a common history with the entire state of Nepal, and the people living there to some extent depend on Kathmandu Valley for their governance. Tibetans, Nepalis and Indians in the Himalayas balance political influences of far-away capitols with the realities of life in the mountains. The integration of these processes shapes the contours of decision-making in this fragile region. This section begins with an overview of the broad dynamics currently impacting people in the Nepal, Tibetan, and Indian Himalayas, and concludes with a discussion of the individual and village-level decisions made by inhabitants as they cope with constant social change.

Livelihoods in the Himalayas: An overview of adaptation in Humla District and beyond

Biological, cultural and political economic processes reveal different insights into the lives of people around the world. Nowhere is this synthesis more mandated than in the Himalayas, owing to the unique constraints on people's livelihoods exercised by high and varying altitudes and diverse ecological niches, combined with heightened political volatility and multiple scales of actors with stakes in political economic outcomes throughout the Himalayas

(Fricke 1989; Orlove and Guillet 1985). This section will reveal the macro-level factors involved in peoples' conceptions of and responses to risk in Humla District, Nepal and surrounding Himalayan areas.

Ecological Factors

Humla district is located in the far northwestern corner of Nepal, between 1500 and 7500 meters elevation. Tucked into the rain-shadow of the Himalayas, Humla experiences relatively little annual rainfall (ACF 2006). Steep slopes lend themselves to erosion, here, especially due to seasonal avalanches and deforestation. Humla is the second-to-least developed of Nepal's districts (ACF 2006), a situation determined by its high Himalayan location and distance from urban centers. The region is accessible via footpaths and the unpredictable flight schedules observed by some of the Nepalese airlines, which bring planes to the landing strip in the district headquarters, Simikot (Levine 1988a; McKay 2002). High-elevation environs are also characterized by large fluctuations in mean temperatures according to season, increasing threats to health among inhabitants of this Himalayan region (Wiley 2004). Recent pressure on livelihoods in the Himalayas is attributable in part to trends in climate change affecting the volatility of mountain environments, in addition to accessibility of services (Diaz et al 2003; Parish and Funnell 1999). Livelihood strategies in the region to some extent have adapted to fit the constraints imposed by mountain habitats, but increased variability due to climate change poses challenges for the adaptive capacity of mountain people.

Higher altitudes make for better grazing pasturelands and less viable agricultural productivity than lower elevations, so throughout the Himalayas, mountain-dwellers tend to be more dependent on livelihoods based on livestock management than their agriculturally-oriented lowland neighbors. Humlis maintain yaks, yak-cow crosses *(dzo),* sheep and goats which provide

the by-products on which their livelihoods depend. Meat, milk, and butter are valuable sources of nutrition for Humlis, and the wool is woven into garments which keep them warm at high altitudes, but it is also sold or traded for grain and other goods. Dung is a valuable source of fertilizer for their agricultural pursuits, but is also burnt for fuel in areas where firewood is scarce. The animals themselves are integral in trade, as they carry the loads of goods over high mountain passes where no automobiles could travel. Goats and sheep are used for trade with India, because large yaks cannot pass these routes, but yaks are preferable for trade with Tibet where the roads are better because they are able to bear more weight (Bishop 1989; Furer-Haimendorf 1975; Levine 1988a; Metz 1989).

Humla's high average elevation also suits it more to the cultivation of barley, buckwheat, wheat and millet (Levine 1988a) than to the relatively lucrative rice farming strategy that characterizes other parts of Nepal[3]. Ethnic Tibetan and Hindu Humlis alike grow these grain staples. While buckwheat takes less energy input and is less risky a crop, millet, wheat, and barley are more desirable, so that an analysis of a household's space allotment to the various crops used to serve as an indicator of relative agricultural wealth: poorer households concentrated on the more reliable buckwheat, while wealthier households with more land and agricultural laborers diversified among the grain staples (Levine 1988a). Agricultural products are consumed as well as traded where there are enough household resources available to expend on the energy-consumptive trade processes. While more Bhotia people participate in trade than do Hindus, the rice procured from this trade was traditionally preferred among Hindu communities for its ritual use. The lower nutritional quality of rice, along with higher levels of

3 Norman Uphoff personal communication with McKay (7/31/06).

Bhotia integration with trade networks that offset agricultural weaknesses, may contribute to Hindu communities' higher rates of malnutrition than Bhotia people's in Humla (McKay 2002).

The trade route itself, complex and time-consuming, was a full-time occupation for many of the Humlis who participated in the full circuit. Typically, traders crossed Indian and Tibetan borders to exchange salt, grain, wool, livestock, and Tibetan and Indian imported goods (Levine 1988a; Furer-Haimendorf 1975). The routes varied, depending on weather conditions at high altitudes allowing passage on the one hand, and responding to the demands of cultural products on the other, as for rice during the June and November wedding months (Levine 1988a). Trade continues to diversify diets by introducing a variety of agricultural products obtainable in return for cash or goods. In poor agricultural years, trade can also mitigate the food insecurity households would otherwise experience. However, these international trade routes are also subject to political fluctuations, as when the Tibetan border was periodically closed after Tibet's incorporation into the People's Republic of China in 1959, or in 1989, when India closed all but two of the trade border towns to Nepali tradesmen (Khadka 1997, 2000; Levine 1988a). Geopolitical and seasonal fluctuations like these can affect the trade cycle by causing a decline in salt-trading, and may also encourage illegal trade practices as strategies against food insecurity, as in the poaching of Tibetan antelopes for their lucrative pellets[4]. Due to political-economic fluctuations (for example, China closed the Humla/Tibet border during the 2008 Olympics[5]), the salt trade is an increasingly tenuous one, with steadily decreasing profit (Furer-Haimendorf 1975; Garver 1991; Khadka 1997, 2000; Levine 1988a). Fewer households are able to participate in trade as the distances to viable trade posts increase and the number of livestock needed to make it a worthwhile endeavor also increases (Levine 1988a). As agricultural land is

4 McKay, personal communication 10/2006

5 McKay, personal communication 08/2008.

increasingly infertile, the options Humli traders have in the wake of a dying trade system decrease. Those Humlis who cannot participate in salt or other trade, either due to lack of livestock, labor resources or to ecological barriers, have been forced, in the past, to depend solely on wage labor as hired shepherds or agricultural laborers to supplement their subsistence activities, and had no other safety net in the event of crop failure. In the introduction to the dissertation, I describe the diversity of strategies to which Humlis currently have access when traditionally productive activities fail them. Scholars consider Himalayan trade to be adaptive due to the competitive advantage it offers participants in mountain environments (Bauer 2002, 2004; Berreman 1978; Furer-Haimendorf 1975; Goldstein et al 2003; Messerschmidt 2002; Orlove and Guillet 1985; Ross 1982-3). Unlike trading as a strategic endeavor to cushion food shortage or provide emergency cash, laboring is a subsistence enterprise, not a profit-accruing strategy (Levine 1988a). Trade and other wealth-accruing practices may well be adaptations, but they are also decisions that involve a certain amount of risk that households in Humla District may or may not be able to absorb.

Throughout the Himalayas pastoralists living at high altitudes practice forms of transhumance, whereby herders graze their livestock on higher-altitude pastures in the summer, descending to lower altitudes in the winter (Furer-Haimendorf 1975). In mountain regions, these activities are often coordinated with the agricultural cycle to optimize household labor and mutual productivity. Livestock management may also enable participation in the trade networks essential to Humli livelihoods. These trade networks serve to reinforce, not only material subsistence, but heritage connections among Tibetans separated by national borders. Bhotia people who participate in trade are therefore also participating in religious rejuvenation or reinforcement, as their travels connect them with Buddhists in Tibet and India and other areas of

Nepal. Such reinforcements may bebeneficial in areas where politics and land tenure are determined by other majorities. By occupying parallel but distinct geographical spaces and depending on different resources for their livelihoods, Hindu and Bhotia communities in northwestern Nepal have generally maintained their economic and cultural borderlands (Furer-Haimendorf 1975). Given that the Hindu community generally associates Buddhists with backwardness and underdevelopment due to their social and religious practices (like eating meat and/or drinking alcohol and participating in polyandrous unions, as well as their low place in the caste hierarchy), ethnically Tibetan methods of distancing themselves from a system that subjugates them may be very important (Frenchette 2004; McKay 2002; Pigg 1992).

Household organization serves to reinforce the conceptual distance between Hindu and Bhotia communities in Humla. While Hindus maintain mostly nuclear household units and marry other Hindu people from more rigid caste societies (Furer-Haimendorf 1975), Bhotia communities traditionally practice a form of fraternal polyandry (Levine 1988a). Although this practice is reprehensible to Hindu communities, polyandry has been much studied for its positive effects on household composition and influences on population levels in scarce environments (Crook and Stamati 1994; Haddix 2001; Levine 1988a; McKay 2002; Ross 1984; Goldstein 1978). It has been shown to decrease fertility rates, and thus the strain on resources afforded by high rates of population pressure, with the result that Bhotia communities tend to be of lower population density than their Hindu neighbors, whose higher population pressure has led to higher levels of malnutrition and food insecurity (McKay 2002). Additionally, the multiple adult males in a polyandrous union allow households to allocate males to trade networks, thus increasing a household's economic viability (Levine and Silk 1997). J.L. Ross (1984) warns, however, that over-attention to the reductions in fertility rates caused by polyandrous practices

may obscure the ways in which other cultural practices compatible with monogamous and polygynous marriage institutions reduce fertility among Hindu communities through behaviors less obvious to anthropologists (see also Goldstein 1981). Andrea Wiley (2004) shows that substantial deficits exist in fertility rates among groups living at high versus those living at low altitudes in Ladakh. It would be difficult to assess this impact on the ethnicities in Humla, as the respective altitudes are less distant than those compared in Wiley's study, but it might be a factor contributing to the lower population densities among Humli Bhotia people. These case studies serve as a warning to a facile assignation of "adaptation" to cultural behaviors.

With the increasing population pressures especially among Hindu villages in Humla, the pasturelands on which Humlis depend for food security are increasingly being converted to agricultural lands. In turn, livestock managers convert higher-altitude forested areas to pasturing and agricultural areas, ultimately decreasing the number of livestock that might subsist in the region and affecting the maintenance of livestock-oriented livelihoods and abilities to participate in trade networks (Levine 1988a). Many Humlis practice animistic forms of religious observance alongside Hinduism and Bhuddism, respectively, so they are also under pressure to appease the deities that are part of the landscape, embodied in water and land, and who are angered by disturbances (Levine 1988a, Childs 2004; Desjarlais 1992). This levies additional strain on subsistence demands requiring the opening of new agricultural and pastoral land.

In many mountain areas of the world, increasing population pressure and global influences, complicated by harsh environments, have resulted in deforestation, general lack of sources of clean water, and hunger (Kreutzmann 2001; Leatherman 1996; Levine 1988a; McKay 2002). As a result, food security and good health become increasingly difficult for the residents to attain. In the Himalayas, ecological pressures are heightened by caste, ethnicity, and land

tenure considerations. The feudal system that arose out of caste delineations has typically concentrated land among the higher castes and pushed lower castes to the more marginal agricultural lands at higher altitudes (Karki 2002; Levine 1988a; see Goldstein and Messerschmidt 1980 for the influence of latitude on agricultural productivity). The various mechanisms of land distribution throughout Nepal's history have continued to maintain this precedent set by caste (ACF 2006; Levine 1988a; Shrestha and Bhattarai 2003). Bhotia people in Humla and throughout the Himalayas generally live at higher altitudes than their Hindu neighbors, along with the occupational castes lower in the Hindu hierarchy.

However, Bhotia people originated in high altitude environs and their livelihood practices reflect this long history. The Tibetan plateau, from which Bhotia people are descended, constitutes some of the highest land at which people maintain livelihoods today, at an average altitude of 4000 meters (Shrestha and Bhattarai 2003), and a rich history of trade relations over the Tibetan border have likewise followed high-altitude trade routes. Thus, Tibetan livelihoods tend to be best suited to higher altitudes (Bauer 2002, 2004; Berreman 1978; Furer-Haimendorf 1975), and many settled there in Humla preferentially. However, Hindu Nepalis in Humla have also participated in both high-altitude livelihood practices and in the trade over the Tibetan border in the Karnali zone throughout history, blurring the ethnic and religious distinctions that characterize this region (Furer-Haimendorf 1975; Levine 1988a).

As a result of an over-emphasis on ecological determinism among Himalayan scholars, accounts of the adaptability of people's livelihoods in this region tend toward functionalist romance on the one hand, and their inhabitants' victimization on the other (Goldstein et al 2003; Levine and Silk 1997; Orlove and Guillet 1985). The preceding discussion shows the complexity of ecological and political forces exerted on the people of the Himalayas, and some general

adaptive mechanisms enacted in response to those pressures. Studies that attempt to understand decision-making among these communities in the Himalayas can reveal more nuanced causes of risk-taking as the result of ecological as well as political and social pressures (Fricke 1989). More of these pressures will be attended to below.

Political Factors and Conflict

In recent years, Nepal has become dependent on foreign aid and exchange, as much as it is dependent on some amount of conflict between India and China. The powerful part donor countries, like Russia and the United States, played throughout the Cold War and thereafter under the guise of international aid, contributed to the escalation of communist-democratic tension within Nepal after democratic elections in 1990 (Khadka 1997). After 1996, the insurgency spread from West to East across Nepal, unifying despite ethnic and religious ideas about identity and subsistence (Schneiderman and Turin 2004). If "communities learn to legitimate their claims to assistance through the same norms and values as the international organizations that assist them" (Frenchette 2004: 26), the events leading to the decade of conflict in Nepal certainly warrant an evaluation of international aid efficacy. Indeed, the Maoist insurgency gained its first and broadest range of support from the very areas in the western hills of Nepal where USAID had instituted its largest integrated rural development programs in the 1980's (Shrestha and Bhattarai 2003: l, Khadka 2000). Extremists attracted political attention and acceptance in the highest, rural areas of the country in the late 1990's, and the insurgency gained intense momentum in 2001. In June of that year, the Nepali heir to the dynastic throne massacred his entire family and himself, resulting in the crowning of the late king's nephew, Gyanendra. Shortly thereafter, then-U.S. President Bush, responding to the September eleventh attacks and world-wide "terrorist" activity, diverted money to Nepal to fight the insurgents and secure

democracy in Nepal, thus giving the government reason to strengthen their position, which in turn led the Maoists to cut off negotiations and intensify their guerrilla war. The new King Gyanendra declared a state of emergency, denying civil rights and effectively ending the eleven-year-old democracy (Shrestha and Bhattarai 2003, Bray et al 2003, Hutt 2004). Four more years of violence disrupted the countryside before King Gyanendra abdicated power back to the democratic government. In November of 2006, a peace agreement was signed between the Nepali government and the Maoists, a nominal end to the conflict which began, arguably, as a result of the international campaign for democracy.

However, international forces were not the only agents in conflict. That an estimated one-third of Nepalis were willing to risk their place in the capitalist regime by rejecting a wage and taking up arms against the government is testimony to how unsuccessfully democratic this government was, and who the beneficiaries were, or were not (Bauer 2004; Bray et al 2003, Do and Iyer 2007; Hutt 2004). In the section above, we saw how the hinduization of Nepal and political ecological disadvantage of some groups lead to the increasing stratification of Nepali society and must have contributed to the sense of powerlessness which lead some Nepalis to attempt to gain access to alternative pathways to power. On the other hand, Lauren Leve (2007) points out that empowerment itself, through development education programs, may have contributed to Nepali women's involvement in the Mao conflict. The causes of shifts in risk-taking behaviors are not always clear-cut, nor are the lines delineating the disadvantaged. In Nepal, as throughout the Himalayas, such distinctions are criss-crossed by ethnic, religious, political economic, ecological and other historically-defined divisions determined by regional as well as international pressures (Levine 1988b). Even within the communist party in Nepal, there are factions along a continuum from those who espouse radical communism (the Communist

Party of Nepal-Maoist, who began the People's War in 1996) to those who represent essentially a social democracy, such as in the largest United Marxist-Leninist Party. It was partly due to these parties' inability to reach moderate compromise that conflict arose (Bray et al 2003, Khadka 1997, 2000).

Allegiances in rural areas of Nepal are complex. Although Humla was neither the target of initial Maoist activity nor a stronghold of the insurgency, Humla was also far from unaffected by "The People's War". The strain on scarce food resources in feeding the Maoist "guests" who dropped in unexpectedly with their weapons and demands was but the most direct way the conflict infringed on household strategies in Humla. Villagers in rural Nepal were caught between the Maoists who conscripted their children and demanded food they couldn't spare, and the Nepali Army who shot and terrorized the villagers for "hosting" the Maoists (Pettigrew 2004). This constituted a substantial security issue in Humla, especially during the intense years of conflict 2001-2005 when villagers feared going out into their fields alone or out on trade routes, as they might be mistaken for a Maoist and shot on sight[6]. Those practicing agricultural and trade livelihoods therefore were not free to engage actively in their livelihood pursuits to the full extent that food security demanded. Other changes precipitated by the conflict in rural areas included the ways in which villagers came up with new norms and codes for alerting each other to danger or for silencing the Maoists' threats (Pettigrew 2004). Children were taught different ways of communicating through fear in some areas, something that might impact their future social relationships on a broad-scale.

The Maoist conflict has affected many of the rural districts in Nepal in a multitude of ways. The Mao conflict has played into out-migration, whereby whole villages of young males

6 McKay, personal communication 10/2006; see also IRIN 2005

have migrated to urban centers to avoid conscription into the rebel army (Pettigrew 2004; 2007), and it offers a reason for families to send their children off to monasteries or urban centers wherever this option is available (Martinez 2002; see Childs 2004 for more on this strategy). Also, the Village Development Committee (VDC) system, a system of village-level government conceived of by the *panchayat* government, was disrupted by the conflict, and has taken on different forms in its post-conflict restitution (see Berg 2006; Martinez 2002; McKay 2002).

Clearly, decisions to engage with either an NGO project or the Maoist rebellion both involved re-conceptions of identity as well as negotiations about existing social hierarchies and gender roles (Agarwal 2001; Berg 2006; Krauskopff 2007; Leve 2007; Pettigrew 2004). Lauren Leve (2007) posits that the two processes may work in concert, because development organizations' emphasis on women's education may have caused the re-conception of gender roles which made it acceptable for women to take up arms in unprecedented numbers during the conflict. My results confirmed this pattern and suggested many additional ways that development altered people's approaches to conflict (see articles in *Cultural Anthropology* and *Human Organization*). Conversely, the conflict forced the temporary abandonment of many development processes, often adversely affecting health, education, and food security for many Nepalis, even as displacement and violence heightened the stress in Nepalis' lives (Berg 2002; IRIN 2005; Martinez 2002). If November 2006 offered a political end to overt violent struggle, the years following have also been long, and fraught with unexpected and expected upheavals in the family, village, and national-level political economic and cultural spheres.

Economic Factors and Development

Humlis and other Himalayan people experience stress in varying ways. Intersection with a wage labor economy, a phenomenon in rural districts across Nepal, had led to some out-

migration of men, Buddhist and Hindu alike, to urban centers as households increasingly failed to meet their subsistence demands long before the conflict increased the intensity of these migrations (Bauer 2002; Berreman 1978; Martinez 2002; Panter-Brick and Eggerman 1997; Pigg 1992). This scenario generally results in higher work demands on the women and children who are left managing cropland and livestock at home. As women are generally responsible for dealing with food security for the household, this increased pressure heightens the already formidable stress of fulfilling their social roles (see Sharma and Prasain 2004; Wymann von Dach 2002). Youth are also migrating at high rates, either to urban centers or across borders to China or India in search of wage labor (Martinez 2002). Some simply wander the streets of Simikot, angry but hopeful that they will stumble upon something better (see also Norberg-Hodge 1991). At the same time, other opportunities continue to unfold nearby, offering Humlis shorter-term migration options (see Introduction and *Human Organization* article).

International change agents play an increasing role in state politics and economic outcomes, and affect the ability of villagers in the South Asian Himalayas to access livelihood security. Due to development critiques, aid money for development has become more decentralized, diverted from multi- and bilateral aid agencies active in South Asia to private sector non-governmental organizations (NGOs) that tend to be less bureaucratic (Gordon 1997; Leve and Karim 2001). No matter who the recipient of funds is, development goals concerning the betterment of peoples' lives may have unintended consequences, especially in light of the proliferation of NGOs operating in Nepal and throughout South Asia (Hoy 1998). People and organizations purporting to help prevent environmental degradation on the one hand may restrict local peoples' access to livelihood resources on the other, leaving it to other NGOs to focus on poor food security and health (Dhakal 2007). Especially amidst South Asian hierarchical

regimens, NGOs have in the past proved oblivious to the power relationships embedded in the communities in which they are intervening, thus accidentally reinforcing and widening pre-existing gender, caste or ethnic inequalities (Bhattarai 2004; Agarwal 2001; Ulvila and Hossain 2002). Sometimes these unequal tendencies are located invisibly in the ideologies of development organizations themselves, and the impact on people can range from identity loss to alienation from resources, usually involving aspects of both (Leve 2001; Pigg 1992; Sharma 2006). Recent efforts to involve local people's participation in the design and implementation of development programs have had varying success. For instance, attempts at social inclusion may have eliminated the effects of gender, but ignored that of caste (Biggs et al 2004). Development agents' emphasis on market integration in the South Asian Himalayas may streamline economies for people of low castes and ethnicities who are dependent on a certain degree of flexibility in their livelihood strategies (Furer-Haimendorf 1975; Levine 1988a). Development of infrastructure enabled the transportation of cheap salt from India to the Nepal Terai, effectively ending the salt monopoly that made the Tibetan salt trade a viable strategy for Himalayan traders for centuries (Bauer 2004; Ross 1983). A by-product of development and increasing economic integration with global markets, remittances from emigrants from South Asia form an ever-increasing part of local economies, with implications for the livelihoods and environments of people back home (Ferguson and Gupta 2002). Tourism in South Asia's Himalayas has been another development of mixed success, opening up new economic opportunities while shutting others down, with varying impacts on environmental and social resources throughout the Himalayas (Bauer 2004; Furer-Haimendorf 1975; Sharma et al 2007).

State power in South Asia is vested in the patron-client relationships spawned during feudal times, which are assumed to impede development. NGOs and other development agents

are therefore often a welcome challenge to state power, connecting local people to global power, in effect superseding national authority (Ferguson and Gupta 2002; Justice 1999; Mehta 1996). In Humla, theoretically, these changes are beneficial to people wary of state power due to generations of tense and uneven relationships between the state apparatus and mountain peoples (see Scott 2009). However, if a state is further weakened by this neoliberal governmentality, the cycle of social service neglect often deepens, and patron-client relationships continue to manifest in new forms of governmentality in South Asia (Justice 1999).

In the wake of political conflict in Nepal, two parties and their adherents vie for influence (Pokharel 2007). Political instability has arisen in places previously too remote to concern themselves with national-level politics. Bhattarai (2004) sees this political pluralism and the resultant factionalism in Nepal as one of the forces exacerbating inequalities. Anthropologists question the validity of a neoliberal governmentality promulgated by NGOs and development organizations that challenges and usurps the role of the state. Development organizations compete with each other and states over contracts, regions, and programming (Leve 2001). An extreme view is that the development agenda is simply a disguised form of western political hegemony, designed to shape South Asian individuals into docile producers and reproducers of the power structures legitimized by words like “empowerment” and “participation” (Khadka 1997; Leve 2001; Sharma 2006). The reality often reveals a wide gap between the ideologies about and the results of development programming (Gordon 1997; Seddon et al 2002). These discussions and critiques show that NGOs' and other organizations' activities in South Asia and the Global South are inherently political, even if their goals are apolitical in tenor and intent.

Many people and organizations involved in development in South Asia genuinely pursue development initiatives with the best intents and hopes for their projects. Anthropologists have

revealed a series of findings specific to South Asian development contexts that bring the future challenges into relief for the benefit of these development planners. Appropriate technology solutions that both reduce fuelwood consumption and acknowledge the long-term conservation goals as well as social and environmental costs of innovation would diffuse more quickly and successfully than less appropriate innovations (Allison 2008). Social inclusion should be one of the highest priorities in the South Asian context, because of the limited access people of outlying regions like the far western districts of Nepal, low castes, women, and certain age groups enjoy (Muhammad and Sheikh 2007). When 'target groups' are homogenous, development implements tend to be more successful, but this requires an understanding of social dynamics so internal contradictions cannot foil the intents of program design (Messerschmidt 1981; Pigg 1992). Donald Messerschmidt (1981) warns that this in-group homogeneity should not be conflated with an over-emphasis on equality, and encourages development agents to work within the caste hierarchy prevalent throughout the South Asian Himalayas. Anthropologists have in other ways emphasized the importance of building on local institutions when encouraging the participation of local communities in development (Berg 2006; Messerschmidt 1981; Norberg-Hodge 1991; Rizvi 1996). In the Himalayan context, development should incorporate the same innovation and flexibility with which local people have adapted to their environments over years of change (Ross 1983).

This section has revealed some of the ecological and political economic factors impacting the health outcomes, subsistence and livelihood mechanisms, religious beliefs/ practices and uncertainty perceived by inhabitants of South Asia. People respond to the changes around them in terms of their experiences and perceptions, rather than strict adherence to rules about optimal

resource utilization or because history and habit dictate a certain response. The cases below showcase the range of permutations decision-making can take in this swiftly changing region of the Himalayas.

Decision-making in the Himalayas: Development and diffusion of innovations:

Decisions made about household composition and production involve weighing the relative opportunity, uncertainty, and social and economic value of certain options, among other vulnerabilities. Anthropological research on household decisions in the Himalayas has blossomed since the 1980s, when anthropologists working in all regions began examining decision-making contexts in order to understand social processes and their locus in the household (see Pelto 1984). To some extent, household decisions are predicated on optimal economic cost-benefit accounting (Berreman 1978; Goldstein 1978). Anthropologists have been quick to point out, however, that individuals may weigh decisions according to alternative values, rather than according to strict ecological or economic maximization schemes (Haddix 2001; Levine and Silk 1997). Decisions about, for instance, the timing of marriage, may be more about village-level politics in Nepal than desired household composition, depending on a household's proximity to political and economic opportunities (Fricke 1995). Alternative schemes also shift over time, as in the case of dissolution of polyandrous marriages in Tibetan communities of the Himalayas, where individuals may decide to partition so as not to compete for fertility success in an undesirable union. This decision is weighed against the social and economic risks partitioning accrues to the partitioner in those communities, and depends highly on social organization, the level of a marginalized member of the household's unhappiness in a union and degree of uncertainty about the future (Levine and Silk 1997). Uncertainty of partitioning may have to do

with the amount of the inheritance a partitioner can expect to receive, as well as the amount of social capital he can expect to lose as the result of rejecting the comforts of a higher-status union (Haddix 2001; Levine and Silk 1997; Panter-Brick and Eggerman 1997). Economics may figure into the decision only indirectly, as Kimber Haddix (2001) showed when pointing out the association between household wealth specialization and partitioning in Nepal.

Likewise, household decisions about livelihoods are in the South Asian Himalayas complicated by a range of factors: intra- and inter-household conflict, the life course of a household, degree of uncertainty about or familiarity with unknown strategies, intensity of the livelihood stress felt by members of the household, capability and extent of mixed-subsistence strategies, proximity to power and social networks, seasons in which livelihood and other stresses occur, types of strains perceived as most urgent and most risky, the riskiness of available strategies, the existence of local risk-mitigating institutions, and degree of integration with global markets (Agarwal 1990; Bauer 2002; Bishop 1989; Ghimire et al 2005; Hrabovszky and Miyan 1987; Levine 1999; Messerschmidt 1981; Orlove and Guillet 1985; Panter-Brick and Eggerman 1997; Rhoades and Thompson 1975). The local contexts of decision-making interact with the macro-level dynamics listed in the previous section to create shifting decision-making landscapes that people navigate when deciding to change, or not change, their life in some way.

Bina Agarwal's (1990) analysis of Indian households' responses to environmental stress and food shortage shows that strategies may shift according to the intensity of strain: households in the study cooperated during moderate food shortage, but dispersed during famine. Gerald Berreman (1978) posits that people in northern India make decisions primarily according to their effects on household composition to achieve an optimal balance between production and consumption. In response to collapse in the Tibetan salt trade, Bhotia communities in northwest

Nepal incorporated a new commodity, Indian salt, into their traditional trade regime (Ross 1983). In a similar but distinct region of Nepal, the Tibetan Khumbu communities of central Nepal responded to the same trade set-backs by replacing trade with Himalayan tourism, while other communities have not been able to respond with replacement strategies (Furer-Haimendorf 1975). Panter-Brick and Eggerman (1997) found that, unlike the hierarchies of resort followed in most other communities in response to intensifying vulnerability, Nepali hill communities tended to try multiple strategies at a time: out-migration, wage labor, trade, loans, and land mortgage in combination, with varying results depending on the household's pre-existing solvency. In this way, the households of Humla Disrict were similar. The manifestation of new strategies is often a sign of a household's increasing vulnerability, so it is important to understand the long and short-term consequences of those strategies (Panter-Brick and Eggerman 1997). Other analyses show that sometimes decisions *not* to change livelihood patterns, or to adopt new opportunities only partially, are just as strategic, as in Tibetan resistance to Chinese authorities' attempts to get them to limit their herd size, because this was seen by herders as too risky in light of their knowledge of historical economic conditions on the Tibetan Plateau (Levine 1999). Tamang women in the Nepal Himalayas choose between individual or child health and household economic productivity when pressured to work long hours during pregnancy when their pregnancies coincide with peak agricultural cycles (Panter-Brick 1989). Women in my fieldsite in Humla had differing relationships to labor during pregnancy, but all of them expressed the primacy of agricultural labor in their decision making processes. These alternative regimes of decision-making often conflict with the embedded and simplistic value regimes of foreign-implemented development innovations and practices. Change agents who heed the competing demands on decision-making in local contexts tend to be better-positioned for successful implementation of development schemes.

Migration is both a strategy and a dynamic affecting the strategies of households in the Himalayas, and is undertaken at multiple levels of livelihood strain for a variety of reasons including political turmoil as well as economic opportunity, and may be either temporary or permanent (Bauer 2002; Martinez 2002; Panter-Brick and Eggerman 1997; Shaoliang et al 2007). Understanding how migratory patterns influence local economies in terms of impacts on labor and cash flow will reveal variations in household vulnerability, and the feasibility of technological adoption. The migratory patterns in the fieldsite are dynamic, and during 2009-10 I observed Humlis responding with a great deal of flexibility to the changes in international markets.

Households may engage with each other in cooperative management of environmental resources as a response to the ecological constraints of mountain societies. Berg (2006) shows why collaborative management of common lands was a better strategy for hill people than for mountain-dwelling people in Nepal. The latter managed irrigation through Village Development Committees (VDCs) who had multiple functions in Mustang as opposed to their low-altitude neighbors' specialized organizations. In the face of conflict, these VDCs proved more flexible than their hill counterparts. Indeed, due to the rigidity of constraints imposed by harsh, high altitude ecologies, cooperative labor and social arrangements are historically instrumental to the mitigation of risks (see Berg 2006; Bishop 1990; Furer-Haimendorf 1975; Messerschmidt 1981; Orlove and Guillet 1985; Panter-Brick and Eggerman 1997; Ross 1983). Their impact on technological innovation, though, is more ambiguous (see *Human Organization* article).

The political conflict in Nepal affected people's decisions about their livelihoods in other ways. Conflict made strategies like transhumance and migration for wage labor riskier, due to the increased possibility of violence that accompanied all travel during that time, but it also made those strategies more attractive to people wishing to avoid Maoist conscription (Martinez 2002; Pettigrew

2004). Whether or not the risk of running away became worthwhile depended in large part upon a person's socioeconomic status or their marginality within the household, according to gender and age in particular, since youth and women may be particularly alienated in Hindu societies and more likely to risk violence, death, and alienation if it offers the chance to improve their standing in society (Karki 2002; Leve 2007; Martinez 2002; Sharma and Prasain 2004). Bad experiences with Maoists or the government forces may also affect villagers' willingness to engage with new strategies in general, leading to more conservative decisions that would not risk the violence and uncertainty potentiated by conflict.

Despite the well-documented resilience of mountain people, as described in the cases presented above, shifts in livelihood strategies are not without costs in the South Asian Himalayas, and strategies may be limited as to their ability to lift households out of poverty (Agarwal 1990; Bauer 2002; Goldstein et al 2003; Karki 2002; Sharma et al 2007). The type of strategies available to households varies by socioeconomic status, season, gender, age, caste, extent of social networks and ethnicity. Generalizations thereabout are difficult, if not impossible, but due to rapid development and concomitant new vulnerabilities in these regions, the capacity of mountain people to adapt may be challenged.

Decisions about Technological Innovations in the Himalayas

Often times, decisions to adopt new innovations come from the reduced viability of old livelihood strategies, but the adoption of new and effective technologies also depends on the existence of local institutions to manage their diffusion, as well as the availability of and power to enact viable alternatives to poor health and livelihood productivity (Berg 2006; Mehta 1996). Anthropologists have investigated barriers and contributors to adoption of innovation, which tend to fall into one or more of the categories explained in detail below: Access to resources,

competing responsibilities, politics of adoption, medical pluralism, local knowledge, and local institutions and treatment processes. All of these issues affect the way people in the South Asian Himalayas perceive the risks involved in technology adoption, apart from how effective or appropriate the solutions are to addressing the problems they purport to address.

The most-cited barrier to diffusion of development innovations in South Asia is structurally-imposed inequality, due to its exclusionary impact on certain sectors of society (Amacher et al 1996; Agarwal ; Bhattarai 2004; Fisher and Holland 2003; Mehta 1996; Nichter 1996; Pelto 2002; Schuler et al 1985; Sharma et al 2007; Wymann von Dach 2002). The difficulty of transporting innovations or development services to people living in areas of mountainous terrain accentuates processes of exclusion, and peoples' ability to adopt new innovations (Niraula 1994; McKay 2003; Pickering and McKay 2007; Rizvi 1996; Wiley 2004). Likewise, processes of development may themselves reinforce access exclusions (Agarwal 2001 ; Dhakal et al 2007; Ulvila and Hossain 2002). Unless the social issues involved in access to innovations are addressed, reduced access to health services and knowledge provided by development agents will continue to adversely impact the health outcomes of certain people more than others within as well as between households in South Asia (Halvorson 2003; Hotchkiss et al 2002). In addition to the general solutions mentioned above, anthropologists have suggested the introduction of development technologies to the higher-status members of South Asian society first, since lower statuses may tend to be more conservative risk-takers, and because adhering to local expectations may make NGO and development processes more familiar and acceptable to local people (McKay et al 2007; Messerschmidt 1981; Muhammad and Sheikh 2007; Smith et al 1993). However, if not implemented with knowledge of unintended

consequences, this strategy runs the risk of contributing to greater inequalities in South Asian society.

Revealing that access issues alone will not solve problems of unmet need with regard to health innovations is one way in which anthropological research on decision-making has illuminated processes of diffusion of innovations in the South Asian Himalayas. Competing responsibilities necessitating the choice between health treatment and household production are responsible for a heightened sense of risk accompanying adoption of health innovations or utilization of health services, especially where they concern a significant input of time, since women are usually indispensable to both production and childcare in South Asian societies (Greenhalgh 1994; Mull 1999; Nichter and Nichter 1996; Panter-Brick 1989, 1993; Stash 1999; Wiley 2004). Both design and implementation of health and other development innovations and services should make amends for the demands they make on people's, especially women's, time resources in mountainous South Asia where livelihoods may already demand the full extent of women's and others' time.

Another set of social factors complicating both, adoption of development services and individuals' allocations of time to tasks, are extended family and social networks. Those who have studied the diffusion of innovations in South Asia note the importance of informal information sources, i.e. family and friend experiences and knowledge, to adoption of new innovations (Bajaj and Nayak 1984; Boulay et al 2002; Mull 1999; Nichter and Nichter 1996; Stash 1999). Furthermore, illness treatment choices in South Asia may take place amidst negotiations among household members of different status and power to enact decisions within the household, creating treatment outcomes biased toward powerful household members' choices (Bhasin 2005; Halvorson 2004; Mull 1999; Nichter 1996). Such negotiations provide further

incentive to involve social groups in health interventions in South Asia. Decisions about intensification of livelihood pursuits and coping strategies are also choices negotiated in the social arena in South Asia (Agarwal 1990; Berg 2006; Berreman 1978; Guillet ; Levine and Silk 1997; Orlove and Guillet 1985; Panter-Brick and Eggerman 1997). As mentioned above, the high altitude agriculture of South Asia's Himalayan region often demands the organization of cooperative local institutions in order to accomplish livelihood goals (Berg 2006; Messerschmidt 1981; Norberg-Hodge 1991; Rizvi 1996). That health and livelihood decisions demand not only the knowledge but the cooperation of kin and neighbors in South Asia means that decisions are not discrete points assorting into random patterns, but are parts of broader social patterns and influenced by the kinds of networks in which people are immersed, and the amount of social power they exert (Boulay et al 2002; Haddix 2001; Nichter and Nichter 1996; Schuler et al 1985; Stash 1999).

In terms of health innovations in South Asia, people have a variety of choices when it comes to goods and services, usually involving two or more of the following: allopathic/western biomedical medicine, ayurvedic, shamanistic, or Tibetan medicine. The existence of plural medical systems means that treatment processes often involve a complex progression of choices negotiated by kin about how to treat what illnesses at what level of intensity during the course of the disease. Evaluations and use of multiple medical systems in different places involves people's experiences with the efficacy of treatment, the symbolic import of different systems, their level of trust in the affiliations of practitioners (e.g. Government health workers are often the least trusted), the distance to services, the severity of disease, the age and gender of the ill, the season in which illness occurs and the work-time that can be spared (Awasthi et al 2000; Bhasin 2005; Halvorson 2004; Mull 1999; Nichter and Nichter 1996; Stash 1999). Different medical systems are given different local meanings leading to variation in quality and outcomes of treatment. Studies of treatment processes

should therefore take into account the functions of plural medical systems, as well as the ways in which this pluralism may work to the benefit of preventative medicine in South Asia.

Anthropologists have concentrated a lot of time on local knowledge of health and the environment in South Asia, because it is often viewed by developers as a barrier to adoption of innovations and development efforts in the region. Recent research has shown, however, that integration of local and foreign expertise can result in more successful development outcomes, if combined cleverly and inclusively (Awasthi et al 2007; Brower 1993; Ghimire et al 2005; Halvorson 2004; Nichter 1996; Rizvi 1996; Sharma et al 2007; Zurick 1990). Traditional healers have also proved effective disseminators of knowledge and healthcare in contexts in which collaboration between them and biomedical practitioners and developers has occurred sensitively (Halvorson 2004).

Development innovations may get caught up in political divisions in South Asia, where political instability and weak central governance makes the politicization of innovations increasingly likely (Hoy 1998; Justice 1999; Orlove and Guillet 1985). Political conflict may impact access to innovations directly (McKay 2003; Nichter 1996; Pickering and McKay 2007) or indirectly through people's trust, acceptance of, or ability to engage with different service providers (Awasthi et al 2007; Fisher and Holland 2003; Mull 1999; Nichter 1996; Stash 1999). In such contexts, NGOs and development agents may become witting or unwitting proponents of western ideologies and progress (Leve 2001; Sharma 2006). In the case of the Maoist insurgency in Nepal, where the Maoists were reacting against the effects of development in their country, a choice to install a smokeless stove may also have been a choice of political affiliation that has implications for a household's vulnerability to politically-induced violence. Then again, the choice to adopt an

innovation promising improved health or reduced labor may have paled in comparison with the opportunity to participate in large-scale revolution of social relationships during the conflict.

CONCLUSION

Himalayan scholars point to the stressful ecology of that region as a prime shaper of human behavior, so contexts of rapid change may have particularly empirical consequences for inhabitants and the scholars who conduct research there. This review has emphasized the ways in which South Asian theorists have contributed to our knowledge about cultural and ecological diversity, and their respective roles in adaptation. Outgrowths of this diversity, religious identities and concomitant aspects of social organization have constituted central components of ethnographic discovery in the Himalayas, revealing much about processes concerning decisions about fertility and family. Mixed-subsistence strategies have likewise received much attention from Himalayan scholars, and studies thereof have pushed biocultural models to new levels of operation, in which adaptive strategies represent interaction at cellular, individual, and population levels. Currently, most studies that take place in the Himalayas concern the *lack* of adaptive responses available in the face of rapid structural change, because ethnography in the region has spanned decades of change, and witnessed the declines in health and livelihood indices almost across-the-board.

The historical and ethnographic literature concerning the Karnali zone of Nepal present the picture of a patchwork of religious, ecological, political, biological and social processes influencing and reproducing the decision contexts of Humlis in a changing mountain landscape. Recently in Humla, rapid change has resulted from, primarily, the conflict that originated at the periphery of the district, the cumulative effects of climate change on mountain regions, and the

political economic integration of Nepal with global markets and international geopolitical fluctuations. How Humlis are able to respond to and shape this change is less well-understood than the processes driving it. On the one hand, this region represents an ecological area like many others in the Himalayas, suitable for generalizations about livelihood experiences. On the other hand, the Karnali zone lies at the boundaries of multiple ethnic and political forces that contribute to its singularity in the region. Proximity to volatile but opportunity-riven international borders, and to national conflict areas, and Humla's more integrated blend of religious and ethnic identities than neighboring areas, pose complexities for human decisions that may offer insight into the less-understood contexts of human decision-making about health and livelihoods. How these decisions connect to broader scales of influence might be more obvious in Humla than in less dynamic or "fragile" environments.

This essay has attempted to show that fleshing out decision-making contexts in Humla District requires knowledge of how political economic and biological forces *interact* and are reproduced by local actors. The concepts of flexibility and diversity so often heralded by Himalayan scholars as essential to adaptivity in mountain areas, also represent a great deal of uncertainty and risk for Himalayan people. Whether culturally or biologically, Himalayan people participate in a costly maintenance of flexibility in the mountains. This is a dance which represents insurance for the ability to exercise future adaptations (risk-mitigation), and maintained at great energy expense. Should rapid social change shift the way Humli people look at the options available to them, the role of flexibility, as both adaptation and constraint, may become less important or viable. As implements connected to the rapid social change occurring in the region, the introduction of NGO technologies represents an opportunity to study the

trajectory of livelihoods in Humla, and how decision-making mitigates or exacerbates the shifting risks occurring there, and at what cost.

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The Biocultural Synthesis in Anthropological Research on Health, Livelihoods and Politics

BIOCULTURAL BACKGROUND

Although the fusion of social and cultural models depicting adjustment to stress in human populations is not new, few social scientists agree about their meeting place. In anthropology, cultural and biological sub-disciplines are increasingly polarized, even as the demand for synthetic understandings of human responses to new phenomena (like climate change and development) intensifies. Adaptation is the concept on which both the biocultural synthesis and the debate surrounding it hinge. In its strict form, adaptation is any trait that increases the reproductive success of those who possess it, with natural selection operating to increase the frequencies of those traits (cf. Wiley 2004: 13). Because adaptation can take the form of short-term or long-term physical or cultural adjustment to environmental stress (cf. Thomas 1976), biocultural researchers have had to seek multiple pathways to understanding human interactions with their environments.

Early biocultural research investigated human responses to stress that had led to increased reproductive success, functional or work capacity, health and nutritional status (Baker 1984, cf. Thomas et al 1989). Mazess' (1975) "adaptive domains" concept supplied a model for adaptation occurring at different levels of biological organization from cellular to ecosystem levels, providing a lens for researching adaptation at socially complex levels. Early bioculturalists found that reversible responses to stress were utilized first, because irreversible strategies cost more in terms of energy and adaptability (Harrison 1966). Biological responses were worthwhile only after behavioral responses to environmental stress had failed (Slobodkin 1968). Both, the resort models in medical anthropology and adaptive strategy models in the livelihoods literature have incorporated reverse-ability and the step-wise fashion in which

adaptations are pursued as key factors in strategy choices. I explore these models in greater depth below.

Biocultural studies began by isolating the most pertinent environmental stresses, i.e. the ones most likely to induce adaptive responses, and creating single-stress models for adaptation, e.g. adaptation to hypoxia (an oxygen deficiency) in mountain regions (Thomas et al 1989). Many of these biological adaptation studies revealed that biobehavioral models may go a long way toward explaining variation between and among populations, since heritable adaptation did not give a complete picture of human response, even in regions where stresses were so acute that the models predicted behavioral strategies would be eroded (Haas and Harrison 1977; Leatherman et al 1993: 203; Thomas et al 1989). They also lead to an increased interest in models which could evaluate multiple stresses on individuals or populations, as well as multiple kinds of responses. Nutritional anthropology excelled in straddling the biocultural divide, as it catered to both physical and cultural understandings of food choices and their consequences for human development (Haas and Harrison 1977; Himmelgreen 2002; Johns and Sthapit 2004; Thomas 1998: 52).

More recently, the adaptation concept has taken on a more processual definition in biocultural studies. Where before, research focused on *completed* adaptation, more recent research has sought to understand adaptation-in-progress, or adaptation as part of ongoing environmental feedback (Levins and Lewontin 1985, cf. Leatherman et al 1993: 205 and Thomas 1998: 50; see also Wiley 2004: 13). This is akin to the concept of resilience in ecology, whereby ecosystems are evaluated for their capacity to respond to future stresses as they are for responses to current ones (Berkes et al 2003; Gunderson 2000). Therefore, not only do adaptations themselves have both biological and sociocultural components, but sociocultural dynamics

influence the health and reproductive environment of humans, competing for attention and influencing the adaptability of responses over time. Furthermore, all adaptations are seen to varying extents to be costly in terms of future adaptability (Dobzhansky 1968, cf. Thomas et al 1989; Goodman and Leatherman 1998).

Political economy perspectives have entered the discourse about "a new biocultural synthesis" (Goodman and Leatherman 1998; Levins and Lewontin 1985; Singer and Clair 2003) precisely because of their ability to contribute to knowledge about the competing social and political demands on health and other aspects of adaptability. Although political economists and biological anthropologists dissent on the extent to which adaptation should be a central concept of it (see Leatherman et al 1993; Singer 1993; Wiley 1993), studies attempting a synthesis have illuminated the role of society and the individual in health outcomes in terms of the evolution of health behaviors (Armelagos et al 2004; Fabrega 1997; Levin and Browner 2005); also in creating and responding to inequality (Aber et al 1997; Farmer 1998; Nichter 2008) as well as to psychosocial stress, human conflict (Leatherman 2005b; Nichter 2003; Pike 2004), infectious disease and climate change (Jackson 2000). To the extent that people must sometimes choose between economic production and evolutionary success, among other competing demands, responses to environmental stresses vary individually and across populations, situating adaptation within the context of political economic histories (Goodman and Leatherman 1998). Innovations in technology may constitute behavioral adaptations aimed at health and/or economic success in the face of environmental stresses, while simultaneously posing social, economic and biological risks to people already coping with a great deal of vulnerability (Ashley and Maxwell 2001; Jodha 2000; Netting 1981; Rogers 1995).

BIOCULTURAL ADAPTATION IN MOUNTAIN REGIONS

Mountain regions are often considered exemplary of biocultural adaptation because they are characterized by the presence of multiple pressures on human livelihoods (thin air, cold stress, limited energy availability, lack of access to services, environmental degradation) and are thus expected to harbor human populations that have had to adapt both socially and biologically to their environments (Fricke 1989; Orlove and Guillet 1985). If flexibility is indeed a sign of adaptability in harsh mountain conditions (Berg 2006; Bishop 1990; Furer-Haimendorf 1975; Orlove and Guillet 1985; Panter-Brick and Eggerman 1997; Rhoades and Thompson 1975; Ross 1984), It is important to understand how social and biological processes shape who has access to it, and what are the costs of such flexibility in any given environment. Biological and cultural elements of mountain environments variously shape individuals' access to different types of human endeavors. The following paragraphs will explore human responses to mountain environments, with particular attention to responses germane to people living in Nepal's northwest Himalayan region. Of particular interest are the nature of responses themselves, the consequences of responses for the long and short-term well-being of mountain populations, and the environmental processes and interactions influencing both environmental constraints and human responses to them. Three categories of responses will be explored below: Responses aimed at 1) Biological outcomes, 2) Socio-economic outcomes, and 3) Political outcomes for the dynamic biosocial conditions of mountain environments. People living in mountain regions may be especially susceptible to risk because of the unpredictability of their environments (Diaz et al 2003; Jodha 2000; Kuznar 2001; Parish and Funnell 1999), so the introduction of technologies potentially poses a biocultural conundrum further intensified by differential access to social, economic, political, and ecological resources within mountain communities. By exploring the range of responses to contexts of

vulnerability, I hope to locate and explore the factors affecting technological uptake in Humla District, Nepal.

Biological Outcomes: Biological and Medical Anthropology Perspectives

Here, I define biological responses as those sociocultural behaviors and biological adaptations aimed at or most directly affecting the reproductive success, health, nutrition, and functional capacity of the human population (cf. Baker 1984). "Biological", in this case, refers to the outcome, rather than the strategy, involved in the response. In mountain environments like those of Humla, cold adaptation and energy efficiency are biological-level responses to climate and food productivity/ availability, while hierarchies of resort, therapy management groups, and explanatory models constitute some of the sociocultural responses to stress that affect health, or well-being. The definition of health varies by discipline and approach. The World Health Organization defines health as "not merely the absence of disease or infirmity but complete physical, mental, and social wellbeing" (WHO 1978), or a state of being. Critical medical anthropologists prefer to define health as "*access to and control over the basic material and nonmaterial resources that sustain and promote life at a high level of satisfaction*" (Baer et al 2003: 5, original emphasis), thus defining it as a relative process rather than a fixed state. Those medical anthropologists taking a stricter biological approach to human problems may choose to define health as "an individual's ability to respond effectively to the challenges of... any environmental conditions that compromise biological (including reproductive) function..." (Wiley 2004: 11), but most medical anthropologists now realize that such a narrow definition calls for a further disease-illness distinction which acknowledges the divergent aims of "experiential" and "functional" health (Baer et al 2003: 4; Wiley 2004).

Arthur Kleinman (1980) offered one of the first sets of definitions distinguishing between disease as pathology, and illness as the experience of "socially disvalued states" (cf. Young 1982: 265), with sickness as the umbrella term for both. Since this nature/culture dualism was so labeled, medical anthropologists have sought ways of integrating biological and cultural anthropological approaches to sickness. Margaret Lock's (1993, cf. Lock 2001) concept of "local biologies" is one such attempt which sees the body as the locus for biocultural processes, whereby experiential health, or illness, is informed by biology, which is subject to "evolutionary, environmental and individual variables" (483). Increasingly the focus of these attempts has shifted from explorations of sickness to explorations of health, or well-being. Concepts like Lock's, which integrate biology and culture as cross-cutting concepts, provide frameworks for the practice of a biocultural synthesis in anthropology. While exploring the human-environment interface through the responses and strategies listed below, the various anthropological approaches to such a synthesis will become clear, and reveal much about the networks of interactions involved in technology adoption in regions like Humla District, Nepal.

Biological negotiation of health: *Cold adaptation*

While few people live at altitudes considered "high" in terms of triggering biological adaptation (roughly greater than 3000 meters; see Beall 2000), people living in mountain regions often endure extreme fluctuations in climate, including intensely cold weather patterns, prompting biological as well as cultural adjustments. Potentially fatal, exposure to intensely cold temperatures makes conservation of body heat the primary biological aim of human strategies, and may include cultural responses such as the use of clothing, shelter, and other technologies and natural resources (Hanna 1976); and biological responses such as developmental acclimatization and long-term acclimation. However, short- and long-term behavioral-cultural responses are evinced by all

humans, regardless of level of adaptation to cold (Huss-Ashmore 2000). Responses vary according to an individual's (developmental and genetic) exposure history, as well as his/her context of social learning. Populations with the longest exposure to cold climates exhibit fewer of the short-term and least costly biological adaptations (e.g. shivering, vasoconstriction) than people with short-term exposure to cold climates. This is because natural selection has operated more extensively on such populations, over time increasing the frequency of more irreversible but more efficient traits (e.g. vasodilation and normal delivery of heat to the body's periphery) in response to continued cold weather conditions (Beall and Steegman 2000). The trade-off is that such cold adaptations may prove inflexible and inefficient in the face of rapid environmental change, and may be relatively expensive to maintain (Frisancho 1993). Confounders or mitigators of cold adaptation even among populations expected to be best-suited to cold climates may include seasonality (Thomas and Winterhalder 1976); unavailability of adequate nutrition, or socio-economic inability to access food resources due to age/gender/status hierarchies or political factors, both of which would reduce a person's capacity to respond optimally to cold (Baer et al 2003; Wiley 2004); variations in levels of activity, as well as in body shapes and sizes, are also determined in part by nutrition status, and affect a person's ability to conserve heat (Beall and Steegman 2000). In turn, responses to cold in mountain regions may have biological and/or cultural sources and consequences. For example, behavioral adjustments to cold involving open fires in poorly ventilated homes during winters in the Himalayas may contribute to higher morbidity and mortality as a result of respiratory infections (Ball and Elford 1994; Wiley 2004: 135). In such cases, technological innovations like smokeless stoves may represent less costly strategies for adaptation to cold (Osmaston et al 1994: 81). As stated above, they may also represent risk and costs to adopters (Thomas 1975: 74-5).

Ecological negotiation of health: Energy accommodation

How populations capture energy in their environments is a major element of their survival, and is affected by environmental resources, social organization and cooperation, physiology, and technology (Huss-Ashmore 2000; Strickland 2002; Thomas 1975; Watts 1988). Energy is needed for the growth, maintenance metabolism, reproduction and production activities of human populations (Ulijaszek 2000), so energy efficiency serves as an indicator of adaptedness to specific environments (Thomas 1976). Work and energetics is thus a primary focus of biocultural research (see Thomas et al 1989; Ulijaszek 2000). In mountain regions, energy flow is limited by isolation from diverse energy sources, climate volatility, and lower relative productivity of food production systems, therefore presenting a special challenge to the humans (as well as other organisms) living there (Huss-Ashmore and Thomas 1988; Thomas 1976). Because energy flows relate most directly to livelihood strategies, the socioeconomic factors and consequences of decisions about energy will be dealt with below, in the "Socioeconomic Responses" section. Here, discussion focuses on the biological ramifications of responses to limited energy availability in mountain regions (see Thomas 1975 for a similar treatment).

At the level of the body, humans may be able to reduce their metabolic demands with smallness of body size and increased fat storage when energy availability is limited (Huss-Ashmore and Thomas 1988; Thomas 1976). Decreased body size, for instance, reduces the amount of energy necessary to maintain functional and reproductive capacity and health, as well as to meet nutritional requirements (Seckler 1982), and may be an inherited trait as well as developmental. The use of body size an indicator of energy efficiency, however, is complicated by the fact that "stunting", the costly effects of undernutrition and/or disease on the size of a developing human body, results from the direction of energy away from growth and development in order to maintain basic metabolic function during childhood, and should thus be seen as a risk indicator for human health, rather than

an energy accommodation device (Martorell 1998). "Numerous factors play a role in determining nutrient intake and infectious disease patterns, including infant feeding practices, the nature of the local diet and foods offered to children, environmental sanitation, and the degree of contamination of foods and liquids" (Martorell 1998: 41-2). Developmentally-reduced body size is as much the product of unequal distribution patterns as lack of energy availability in a given environment, and thus complicated by village, national, and international-level political economic, ecological and social processes (Levins and Lewontin 1985). Reductions in body size and undernutrition as the result of food shortage may have negative consequences for growth, reproduction, functional capacity and ultimately, survival (Thomas 1975; Ulijaszek 2000) as well as disproportionately affecting marginal members of society (Gautam 2008; Levins and Lewontin 1985: 262). The extent to which acute and chronic energy stress variously affect work capacity requires further social scientific research (Stricland 2002). Reductions in activity levels, as an alternative, may constitute a short-term strategy to alleviate food stress, but with adverse consequences for economic productivity, especially among households already economically marginalized (Huss-Ashmore and Thomas 1988).

Socio-cultural and technological responses to energy scarcity also entail a range of biological consequences and constraints. Many studies of highland-region behaviors affecting energy availability and usage idealize the adaptedness of agropastoralist and other subsistence activities, including long-distance trade, transhumance practices, choice of livestock, family size and composition and subsistence scheduling, because of their efficiency in utilizing and supplementing the limited energy resources of mountain areas (Dennett and Connell 1988; Netting 1981; Orlove and Guillet 1985; Wiley 2004; see, for instance, Furer-Haimendorf 1975; Rhoades and Thompson 1975; Thomas 1976). The primary biological consequences of these strategies,

however, vary, and consist of the interactive and cumulative effects of physical activity and nutrition on bodily health. These are especially subject to natural selection when at work among pregnant and lactating women whose work is essential to household economic production (Panter-Brick 1989; Panter-Brick et al 1993; Wiley 2004).

Much of the research in this arena has traced unequal distribution of resources to differential health outcomes. Differentiation in food distributions may follow gender lines, whether in regards to getting a greater percentage of foodstuffs, or because of greater access to alternate livelihood strategies, such as out-migration for labor (Devereux 2001; Kapungwe 2005; Kedia 2004; Moreno-Black and Guerrón-Montero 2005; see Wymann von Dach 2002 for gender differentiation specific to mountain regions). Over time, these responses could potentially result in higher infant mortality rates for one gender (Cronk 2000). Distributions may also follow class lines outside the household (McElroy 2005; Singer and Clair 2003), although not always in expected ways. Moreno-Black and Guerrón-Montero's (2005) study of food security in the Afroecuadoran highlands documents similar consumption patterns among all classes, but discovered that resource sacrifices among the lower classes in the community were occurring in other areas than food resources. Wiley (2004), on the other hand, found that higher-status women were experiencing a higher physical toll than lower-class women, due to gender-biased labor organization and larger landholdings. Gender and class are but two of the many ways certain energy accommodating practices may benefit some at others' expense.

In order to frame these sometimes mystifying social differentiations, a great body of literature documents health and the body as venues for politics, whereby political economic inequalities, ecologies and identites are internalized by local bodies (Balshem 1991, Briggs 2003; Fabrega 1997; Foucault 1980; Obrist 2003; Scheper-Hughs and Locke 1998; Vecchiato 1997).

These internalizations are especially influential symbolically and materially amidst the rapid social change occurring in societies that are interacting in new ways with global market economies and/or states (Borre 1991; Joseph 2005; Leatherman et al 1993; McElroy 2005; Nichter and Van Sickle 2002; Phillips 2006). In Frenchette's (2004) study of Tibetan refugees in Nepal, for instance, identities formed through interaction with international organizations resulted in greater access to resources for refugees than their Nepali counterparts of similar origin (see also Childs 2004). HIV stigmas and insensitive health programs have drawn barriers to access to health services in communities where certain groups are unevenly affected by disease and lack of resources (Baro and Deubel 2006; Fife and Wright 2000; Olenja 1999; O'Donnell 2004; Pelto 2002). When strategies to mitigate energy scarcity within certain households fail, the impact on health may be cumulative: sickness ensues when energy demands are not met, reducing the amount of labor available for investment in economic production, in turn reducing the energy resources available to a household (Leatherman 1996, 1998, 2005; Panter-Brick 1993). Inequalities are not immovable barriers to well-being, but are contested and contestable. Amidst extreme resource scarcity, politics and conflict may become venues for resistance, attempts to re-draw the lines of access to resources in a community (Bray et al 2003; Leatherman 2005b; Pettigrew 2007; Pike 2004). These studies show that energy accommodation strategies are embedded in biocultural matrices that position health and evolutionary success at the center of competing demands on human energy. This also means that the health risks and vulnerabilities people perceive and experience vary according to economic, social, political and ecological factors (Nichter 2003; Sibthorpe 1992), and only by disaggregating decision-making data within and between households can researchers understand the relationships between lived experiences of health and patterns of social change (Carter 1995).

Social negotiation of health: Health-seeking and therapy management in pluralistic societies

People navigate resources for and impediments to health in different types of social and medical systems, as well as ecological environments. Four concepts from medical anthropology are especially pertinent for explaining the socio-cultural contexts of and ramifications for health-seeking in mountainous areas: Explanatory models, pluralism, resort, and therapy management.

Explanatory models (EMs) of illness constitute a concept developed by Arthur Kleinman (cf. 1980), useful for evaluation of different people's experiences of health and their impacts on biology. Individuals' explanatory models vary within groups according to etiology, experience of symptoms, pathophysiology, course of sickness, and treatment, and are embedded in both social and cognitive processes associated with health (Kleinman 1980: 105). While individuals form EMs in response to particular illness episodes, they are drawn from conglomerate semantic networks, or "network[s] of words, situations, symptoms and feelings which are associated with an illness and give it meaning for the sufferer" (Good 1977: 40). Within these semantic networks, then, EMs become guides to health-seeking behavior: "Thus, from the ethnomedical perspective, it is the EM and the semantic sickness network it constitutes and expresses for a given sickness episode that socially produce the *natural history of illness* and assure that it, unlike the *natural history of disease*, will differ for different health care systems" (Kleinman 1980:107; see also Pelto and Pelto 1997). Explanatory models may also serve to differentiate among various patient and physician beliefs and health behaviors, thus revealing power asymmetries embedded in the treatment pathways (see McCombie 1999; Pelto and Pelto 1997; Rashid 2001). The main contribution of EMs to understanding health-seeking behavior and its impacts is in this integration of cognitive with material processes (Pelto and Pelto 1997). The following paragraphs address this integration by exploring some of the social decision-making processes through which people navigate health.

Mountain health care systems are usually characterized by the co-production of more than one medical system, because they often harbor diverse religious and ethnic populations isolated from encroachment by a dominant and/or nationalizing culture (Berreman 1963; Bishop 1990; Kreutzmann 2001; Levine 1988; Ross 1984; Scott 2009; Walter 2003; Zurick 1989; see Netting 1981: 223 for a critique of this generalization).The existence of plural medical systems means that treatment processes often involve a complex progression of choices, usually negotiated socially, about how to treat certain sicknesses (Bhasin 2005; Csordas 1999; Nichter and Nichter 1996; Poss and Jezewski 2002). Complexes of health-seeking behavior are sometimes called "hierarchies of resort" (Romanucci-Ross 1977) because of this progression, but most medical anthropologists now prefer simply to discuss "health-seeking behavior" because the resort process is not linear and often varies within groups (Scrimshaw and Hurtado 1984). Byron Good (1994) warns against the biocultural tendency to reduce human health-seeking to rational or purely evolutionary aims, thus ignoring the structures barring access to such aims and the differently-weighted values associated with illnesses. People negotiate treatment choice according to a range of criteria, including but not limited to: familiarity with practitioners and technology (Rogers 1995), use of or beliefs about health and treatments (Boulay et al 2002; Good 1977; Stash 1999), perceptions of risk associated with illness, treatments, and/or social change (Glass et al 2006; Halvorson 2003a; Kleinman 1980; Lawton 2002; Leatherman 2005a; McElroy 2005; Rogers 1995; Sibthorpe 1992; Sommerfield et al 2002; Stash 1999; Strickland 2002; Trostle 2005), political affiliations associated with health practitioners and/or technologies (Awasthi et al 2000; Fisher and Holland 2003; Hessen et al 2001; Mull 1999; Nichter 1996; Orlove and Guillet 1985), availability of or distance to services, along with other economic *and social* costs of using them (Cunningham-Burley et al 2006; Greenhalgh 1994; Halvorson 2004; Justice 1999; Kleinman 1980; Niraula 1994; Schuler et al 1985), gender

and/or age of the ill (Pandey 1984; Panter-Brick 1993; Wiley 2004), the severity of the illness (Kleinman 1980; Mull 1999), and the statuses and negotiation processes of those who have a moral, social or economic stake in the treatment choice (Good 1977; Halvorson 2004; Leatherman 2005a; McKay 2002; Saillant 1998; Trostle 2005).

In medical anthropology literature, this last phenomenon exerts a great deal of influence on treatment strategies, and ultimately, on health. Janzen (1987) coined the term "therapy management" to describe health and treatment as cumulative social processes in which the choices people make combine structure and agency in a mutually influencing feedback relationship: "It is the essence of the processual or generative model that choice and decision occur not in a vacuum, but in society" (Janzen 1987: 74). That is, when people make decisions about their health, they are responding to a certain health environment, but also collectively influencing that health environment (Trostle 2005: 25-6).

The "therapy management group" (Janzen 1987), then, describes health decisions involving social negotiations among multiple actors. Knowledge of the health negotiation process led to more robust medical anthropological models of decision-making that accounted for knowledge use and contestation as well as generation. For example, W. Dressler and colleagues (2005) showed that health outcomes were more positive when higher levels of cultural consonance were associated with the social networks of health-seekers. In mountain regions where resources are already stressed, caretakers may have to negotiate their goals for child health with higher-status members of a household intent on economic productive aims (Halvorson 2003b; Halvorson 2004; McKay 2002; Panter-Brick 1989; Wymann von Dach 2002). For these reasons, identifying therapy management group dynamics remains an important aspect of understanding the biological implications of health-seeking behaviors.

This section has reviewed the human biological, ecological and socio-cultural processes involved in maintenance of human health, reproductive success, nutrition and functional capacity in mountain regions. Biological and medical anthropological perspectives have much to contribute to understandings of decision-making in situations where resources are stressed, but they also have much to gain from integration with development and livelihoods approaches to mountain ecologies. The next section will address the socio-economic implications of humans' biological and cultural responses to stress, using the livelihoods literature.

Socioeconomic Outcomes: The Livelihoods Literature

The socioeconomic outcomes of human endeavors indicate a population's adaptedness to its environment, and result from the activities aimed at supporting various livelihood pursuits. After reviewing the background for the livelihoods literature, this section will address the kinds of livelihoods strategies used in mountain regions to achieve household production and consumption demands, along with the sociocultural and biological contexts and consequences of those decisions and strategies. Although the adaptation concept is not centrally used in this literature, the decision-making concept works in its stead, describing the process by which people attempt to create their ideal environments with all the resources available to them.

The livelihoods literature builds on Sen's (1981) entitlement assets framework, and argues that livelihood strategies are composed of five "capitals": human, social, physical, natural and financial (Haan 2000; Rakodi 1999; Scoones 1998; Yaro 2004). Among the materials understood to make up these capitals are a household's monetary and other stores, environmental resources, social claims, and degree of access to them (Chambers 1992; Chambers and Conway 1992). For instance,

human capital has been measured in other studies by collecting data on labor assets available to a household, social capital by assessing a household's integration with social networks providing claims to exchangeable benefits, including political power, physical capital by collecting data on the non-cash inputs and outputs required for production, natural capital by evaluating the resilience and sustainability of the environment from which a household draws its resources, and financial capital by measuring a household's cash income against its debts and expenses (Bebbington 1998; DFID 2000). When vulnerabilities exist, households tap into their five capitals to respond to or compensate for that stress. The response pattern is understood to vary according to the extent, duration, and composition of vulnerabilities affecting and incorporated into households. Thus, the livelihoods literature attempts to answer the question: "Given a particular context ... what combination of livelihood resources (different types of 'capital') result in the ability to follow what combination of livelihood strategies... with what outcomes?" (Scoones 1998:3). Scoones continues to explain that "of particular interest in this framework are the institutional processes (embedded in a matrix of formal and informal institutions and organizations), which mediate the ability to carry out such strategies and achieve (or not) such outcomes" (1998:3).

Researchers analyze livelihood strategies in this literature in terms of costs and benefits, where the adoption of a particular livelihood strategy by a household makes use of finite resources, thus incurring a cost to the household as a result (see Ellis 2000; Reardon 1997). Critically, as stated above, the costs and availability of strategies are not necessarily distributed evenly among the individuals composing a household, nor between households (Pelto 1984; Rocheleau et al 1996). Household resources may flow through status hierarchies, making certain people more or less vulnerable (Devereux 2001; Kapungwe 2005; Kedia 2004; Moreno-Black and Guerrón-Montero 2005; Pettigrew 2007:307). Despite the importance of these potential

impacts on the individual, fieldwork on the roles of different types of individuals in decision making about household coping strategies has only scratched the surface, and the prevalence of variables other than gender have not been well-differentiated (see Oliver-Smith 1996; Pottier 1999). Individuals within households not only have various constraints and assets to navigate, but varying goals and aspirations as well. Where livelihood security may be a household goal (Frankenberger and Goldstein 1990; Scoones 1998; Yaro 2004), individuals within a household must negotiate decisions about personal welfare with each other and with their potential selves (Mills 1997; see also Appadurai 1990). This process of negotiation bears the burden of compromise: power differentials are inscribed in varying vulnerability outcomes, and the processes that created them are embedded in "hidden transcripts" (Scott 1990).

Corbett (1988) first theorized the process by which a household utilizes strategies to combat livelihood stress as a continuum of intensification, whereby households take the path of least resistance first, choosing the strategies that are the least costly and/or irreversible, then intensifying them as stresses are prolonged. Davies (1996) later classified these behaviors into types of livelihood strategies, where "insurance strategies" are preventative measures aimed at avoiding risks, and are the least costly and most reversible. "Coping strategies" are enacted next, in response to short-term livelihood stress. "Adaptive strategies" are utilized when the stress is prolonged or systematic, and finally, "survival strategies" consist of last-ditch, nearly or entirely irreversible strategies with the aim of survival (as opposed to well-being or quality of life). Strategies to attain health are closely related to livelihood strategies (Kapungwe 2005; Leatherman 1996, 2005), and health is an asset required in order to maintain livelihoods (Homewood 1995; Leatherman 1996, 2005; Pike 2004), yet health is often treated in the literature as an end in itself, rather than a strategy linked to livelihood (Sommerfield et al 2002).

In order to reveal a more dynamic dialectic between strategies and vulnerabilities, Watts and Bohle (1993) conceptualized the household's "space of vulnerability" as "the mutually constituted triad of entitlements, empowerment and political economy" (Yaro 2004:32, citing Watts and Bohle 1993) that together constitute the determinants of and responses to vulnerability. Leatherman (2005) elaborates on the "space of vulnerability" concept by incorporating threats to health, household economy, and psychosocial stress as threats to household livelihoods. As a result, we gain an understanding of the kinds of decisions made by individuals, within households, threatened by political or economic insecurity (Leatherman 2005a; Devereux 2001).

The Livelihood Strategies: The most direct way to transcend economic stress is for a household to either intensify or extend its production activities (Weeks 1998: 473-506). In mountain regions, where soils are agriculturally marginal, people supplement agricultural activity with pastoralism, long-distance trade, migratory labor, and/or other business pursuits that are available (Orlove and Guikllet 1985; Rhoades and Thompson 1975). Both livestock and plant domesticants there are subject to ecological constraints, such as cold weather and climate volatility. Yaks in South Asia and llamas in the Andes are cold-adapted livestock preferred for their hardiness in the highest altitudes (Orlove and Guillet 1985). However, hybrids and other livestock like sheep and goats may be more productive and/or more able to traverse mountain passes than the ones most adapted to cold (Furer-Haimendorf 1975), so householders must make choices about them based on their productive ideals, the amount of risk they perceive associated with livestock choice, as well as the amount and type of vulnerability they perceive to be associated with their ecological, economic, social, health and political situation (see Bishop 1989; Levine 1999). The same process applies to crop varieties: cold-adapted varieties tend not to be the most culturally preferred varieties, so agriculturalists must navigate an acceptable balance based on the technologies that are available, the

values applied to goods, as well as according to the constraints imposed by seasonality and other competing demands on their productive resources (Levine 1988).

With the rise of more efficient technologies, as well as the integration of global markets, many mountain-living people have adjusted/are adjusting their traditional production activities to incorporate new information, opportunities, constraints, values, risks, and imaginaries (Bauer 2004; Goldstein et al 2003; Leatherman 1996; Levine 1999; Netting 1981). The varying impacts this process has had on people in mountain regions are too diverse to generalize in any accurate way. Suffice it to say that in most places the riskiness of livelihoods has increased, though certainly not in all (see Halvorson and Hamilton 2007; Goldstein et al 2003; Harries-Jones 2004; Jodha 2000; McMichael 2004). Technologies themselves are embedded with culturally pertinent information, so decisions about adoption of production technologies are not always about optimizing production, and may represent alternative goals, desires, and risks for different households and their respective members (Allub 2001; Henrich and McElreath 2002; Kuznar 2001; Netting 1981; Rogers 1995). For example, cookstoves in rural Nepal may represent western progress, higher status, and very little trade-off in terms of risk for male household heads whose decisions carry the most sway, while for women who are in charge of feeding the family, they might represent a great deal more risk with potentially smaller social pay-off, which would potentially reveal itself in the ways in which women utilized the stoves, and their resulting efficacy.

Migration for labor, tourism and other endeavors to generate cash for the household are increasingly available options in mountain regions relatively isolated until recently from market economies. Anthropologists focus on these strategies because they tend to affect change more rapidly and drastically than more traditional strategies which tend to be historically entrenched and adapted to localized ecological settings (Goldstein and Beall 1981; Netting 1981; Norberg-Hodge

1991). In addition to affecting change in the economy, livelihood strategies associated with the cash economy often change the nature of social and human-environmental relationships, as well. This may have shifting ramifications for a certain gender, age group, socioeconomic status, caste, or ethnicity, depending on preexisting structures and the network of influences on them (Bauer 2004; Bishop 1989). Migration, whether for cash labor or for other reasons, affects household size and composition and has varying effects on the workloads and consumption patterns of those who remain in the household (Goldstein et al 2003). It also shifts and blends transnational identities and population structures, with unintended as well as intended consequences for production and consumption capabilities (Hondagneu-Sotelo and Avila 1997). On a large scale, migration increases developing nations' dependence on foreign economies and resources. In some places tourism has supplanted increasingly inviable livelihood pursuits, as with the salt trade in sections of the Himalayas- These changes have had profound impacts on local values, ideologies, risk management, social organization and production schemes; in short, affecting every facet of local cultures (Bauer 2004; Furer-Haimendorf 1975; Goldstein and Beall 1981).

Other choices affecting household size and composition also affect the balance between production and consumption demands within a household, much as they affect the level of health members of a household can achieve. The costs and benefits associated with members of a household may vary according to absolute family size, temporary and permanent migratory patterns, unequal allocations and contributions of household resources by various members, the life course of a household (how many older versus younger members), marriage practices, the economic environment, and health patterns in a population, to name a few (Bledsoe 1995; Bradley 1995; Elford 1994; Greenhalgh 1994; Haddix 2001; Levine and Silk 1997; Netting 1981; Stash 1999;

Wiley 2004). Therefore, decisions about household size and composition are rife with competing influences which themselves must be weighed against economic productivity.

Especially in rural mountain areas where subsistence demands are so integrally tied to the ecology, use and conservation of natural resources are concerns central to livelihoods (Messerschmidt 1986; Netting 1981). Complicating this balance is the fragility generally associated with mountain environments (Jodha 2000: 544). Much debate surrounds the causes, inevitability, social construction, and trajectory of environmental degradation in mountain regions, as well as the conservation-livelihood interface. In *The Himalayan Dilemma*, Ives and Messerli (1989) spell out the problems with degradation theories that look only at the proximate influences on environmental change, rather than the global distribution structures that make 'degradation' the most immediately viable option (see also Fricke 1989; Ives 2004). Local ecological strategies are often shifting results of interactions with the intersecting economic aims of other actors at regional, national, and international scales (Jodha 2000; Vandermeer and Perfecto 1995). This means that, rather than assigning blame, purveyors of ecological strategies may benefit from awareness of the network of influences on ecological resources at multiple scales (Robbins 2004). Technological advancements, sound policy interventions, and local management plans should consider the overlapping aims of livelihood and conservation (see Jodha 2000; Netting 1981) as a more socially acceptable arena, and an opportunity, for environmental policy.

Through analyses of local livelihood strategies and their contexts, anthropologists gain insight into the risks and vulnerabilities associated with certain decisions for different individuals within and between groups. Decision-making is a central component, not only of socioeconomic

aims, but of political ones as well, and the next section offers an overview of the types of political actors and contexts facing people in mountain and other communities in the developing world.

Political Outcomes: Anthropology of NGOs/ bureaucracy and conflict

Strategies aimed at political ends are less well-studied in anthropology than biological or socioeconomic strategies, and therefore do not fit as easily into the decision-making models that evince so much overlap above. This section will provide a brief review of the anthropologies of bureaucracy and conflict, since both constitute varying political options for people whose strategies are power-oriented. Because politics and power operate to shape people's access to natural and other resources, an understanding of political dynamics in a community is essential to understanding the vulnerabilities that shape decision-making about new technologies and other strategies aimed at health and livelihoods. Individuals also use their resources to leverage their political power to the extent possible, shaping their ecological and socio-political environments as they go. "[E]nvironmental change and ecological conditions are the products of political process" (Robbins 2004: 11). In the context of decisions about technologies and livelihoods, politics come into play at the local, regional, national and international scales (Blaikie 1985; Haan and Zoomers 2005; Natcher et al 2004; Rocheleau and Edmunds 1997). Power relations structure the "nature" to which certain people have access to resources/technologies, and may be overtly demonstrable or coercive in their impact (Paulson et al 2003).

The title, non-governmental organization (NGO), encompasses for-profit and non-profit enterprises, large, unwieldy bureaucracies and tiny one-person shows (Fisher 1997; Heyman 2004; Schuller 2007), and the proposed endeavors of existing NGOs range from environmental to social justice to religious to ethnic to gendered in emphasis (Fisher 1997; Leve and Karim

2001). Some researchers have questioned the category itself, contending it too vague and diffuse to be an analytical tool (Fernando and Heston 1997), while others merely point out that NGOs are composed of different actors and scales, cautioning that to lump them all together is to obscure their complexity, and poor science to boot (Fisher 1997; Hoy 1998; Leve and Karim 2001). Critics of NGOs have gone as far as to label them contributors to the distribution of inequalities that were formerly the domain of state control or global economics. Such claims are based on the exclusionary practices of NGOs, the tendency for them to concentrate wealth in the hands of the already-rich, and the ways in which they may promote 'western values' at the expense of local ones (Agarwal 2001; Leve 2001; Sharma 2006; Ulvila and Hossain 2002; Western and Wright 1994). Many researchers have spoken to the inherently political nature of non-governmental organizations, despite the often apolitical discourse surrounding them (Clark 2003; Dema 2008; Fisher 1997; Leve and Karim 2001; Paulson 2005; Pigg 1992). These politics may become especially sensitive in cases where caste hierarchy has intersected with ethnic and political violence. A popular claim of participatory NGO projects is that they empower women in disadvantaged societal roles. However, what empowerment means to NGOs may not be what it means to local people, and the concept has been critiqued for its contribution to the shifting of state responsibilities onto local shoulders through the NGO-assisted privatization of the economy (Janes 2004). Candice Bradley (1995), in her research in Kenya, revealed another confounder of "empowerment" which resulted when newly-won women's educational opportunities put them in competition with men over scarce economic opportunities, which led to the social sanctioning of violence toward school-aged women in Kenya through religion.

It is necessary to understand not only the ways in which NGOs are agents in the evolution of societies in a global order, but also the ways in which local people combine new and old

discourses and knowledge, affecting the manifestations of development in a given setting (Fisher 1997; Paley 2002). S.R. Stoer and F. Rodrigues (2005) reveal the complexity of the social-environmental relationship in the wake of the communist influence in the Ukraine, where local people ply together conceptions of nature and health, using their NGOs to build social capital through growing networks that help citizens get what they need from local ecologies, and what the government can no longer provide. This work speaks to the knowledge and agency of local individuals, showing the contestation and coincidence involved in the interaction of NGOs with places and people, that in some cases opens doors and in others, closes people off from access to local economies and ecologies (see Agarwal 2001; Belsky 1999; Berkes 2003; Berlin and Berlin 2004; Haan 2001; Devereux 2001). The particular nature of the interaction between NGOs, states and civil society in a given context has much to offer analyses of governmentality and access to resources within a community.

When conventional political strategies are insufficient to allow people access to basic needs and comforts, conflict may arise. In the anthropology of conflict, the oft-cited link between unequal distribution of resources (social status or material resources) and conflict (see Baro and Deubel 2006; Bray et al 2003; Brown 1985; Carneiro 1978; Do and Iyer 2007; Leatherman 2005b; McCauley 1990; Scott 1976) may help explain the determinants of war and conflict, even if it does not encompass the impact of violence on people's lived experiences, identities or decision making (Dumont 1992; Olujic 1998). Situations of political unrest impact people's livelihood choices as well as decisions and abilities to engage with new technologies and services (Pike 2004). Conflict may bar people's access to basic resources as well as posing a perceived threat to livelihood mobility, and it may superimpose symbolic import to technologies otherwise deemed apolitical or neutral (Pettigrew 2004; Robbins 2004: 55). In so doing, conflict shifts the balance of power within

and between communities in potentially dramatic ways. For this reason, areas involved in recent conflict indicate situations of environmental stress and present opportunities for research on decision-making patterns, as well as for better understanding the causes and consequences of violence.

THE BIOCULTURAL SYNTHESIS

Whether we are investigating biological or socio-cultural responses to stress that impact on adaptation, a major indicator of adaptability to biosocial change is the flexibility with which an individual or group is able to respond to changes in surroundings. Many researchers of mountain ecologies have postulated that humans in mountainous areas benefit from more ecological and cultural diversity than in lowland areas, critical to the flexibility of human responses to change (Jodha 2000; Orlove and Guillet 1985; Rhoades and Thompson 1975). Others more cautiously note that mountain regions may also be among the first to be affected by the economic and ecological dynamics scientists have forewarned (Diaz et al 2003; Parish and Funnell 1999). Adaptability becomes increasingly important as climate volatility increases and the global economy is increasingly integrated and thus subject to more generalized patterns of risk (Fricke 1989; Panter-Brick and Eggerman 1997; see Phillips 2006; Post 2006). As these changes take place, social science monitoring of human responses are well-positioned to address these questions of biocultural adaptation. Political economic and ecological perspectives on adaptation require that we ask questions about adaptedness for whom, at what cost, and when?

The decision-making concept in the livelihoods and politics literatures operates much like the adaptation concept in biological sciences: as the mechanism through which certain patterns are perpetuated at the expense of others. Whereas decision-making emphasizes the ways in which

people shape their environments, though, adaptation focuses on the ways in which humans *respond* to their environments. In this way, decision-making performs similar functions as adaptation while answering to many of the criticisms levied against functionalist or reductionist anthropology. That one is conscious and the other unconscious seems to me to be beside the point. Humans and their parts "make decisions" according to the set of circumstances facing them at a given time, and although those "decisions" are cumulative in effect, the various actors are never omniscient. Certain decisions are parts of (unconscious or conscious) strategies that in retrospect may be deemed adaptive for certain people for a certain period of time, but given the complexity and dynamism of all the environmental and human actors intersecting those strategies, those are very fortuitous decisions indeed. The social scientific goal, then, like the ecological goal, is to come up with increasingly applicable general frameworks in which the various actors of a given research setting become identifiable and its micro-patterns unfold.

The confluence of perspectives presented here provides a framework for addressing technological adoption in mountain regions. By integrating biological and cultural responses to changes in humans' environments, we get a more holistic and nuanced view of the contexts of vulnerability people navigate in order to make decisions about new ideas and materials in their lives. The similarities between the biological studies of human health behavior and livelihood studies of socioeconomic behavior offer anthropologists the opportunity for a ready-made integration of biocultural concepts. The challenge is to incorporate studies of humans' political behavior in just as systematic a fashion, and to develop a lexicon and transdisciplinary field that captures the knowledge and expertise of researchers, of applied experts from development, biological, and social fields, and of local people . In the next essay, I will attempt a methodological framework for this integration. Medical anthropological perspectives are well-positioned to use decision-making

about health as a cross-cutting platform for understanding resilience, development and social change, since health lies at the nexus of biocultural strategies for survival and meaning, and is useful at the individual as well as population levels of analysis.

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Approaches to Technological Uptake and Their Centrality to the Study of NGO Innovations in Humla District, Nepal

APPROACHES TO DIFFUSION OF INNOVATIONS IN DEVELOPMENT

In anthropology, a variety of methods exist for measurement of decision-making and vulnerability related to development efforts and technologies. Methods from human ecologies and energetics (Bird and Bird 2008; Daly and Wilson 2001; Fitzhugh 2001; Goldstein 1976; Haddix 2001; Netting 1993; Winterhalder et al 1999), symbolic anthropology (Douglas and Wildavsky 1982), peasant studies (Cancian 1989; Scott 1976; Wolf 1986), the anthropology of conflict (Kuznar 2007; Olujic1998), and nutritional and medical anthropology (Foster 1979; Messer 1984; Pelto and Messer 1989) have variously shed light on human decision-making in times of stress. Using both qualitative and quantitative measures of human vulnerability, anthropologists contribute to knowledge about variations in responses to stress across time and space (Anderson and Cook 1999; Hubert 2004; Pelto and Freake 2003; Perreault 2005). While quantitative studies from biology assess the proximate determinants of risk-taking behavior and consequences, and quantify uncertainty in comparative terms (Goland 1993; Himmelgreen 2002; Winterhalder et al 1999), political economic and qualitative methods explain the mediating effects of perceptions and lived experiences, as well as of multiple levels of power on hypothetical optimization models within groups (Daly and Wilson 2001; Leach and Fairhead 2000; Pelto and Freake 2003; Riley et al 2006; Stoer and Rodrigues 2005; Winterhalder et al 1999). Combining time-honored participant observation with techniques piloted in other academic fields, anthropologists pioneer vulnerability and risk-behavior studies across disciplines (see Alwang et al 2002; Chapman and Berggren 2005; Lambert and McKevitt 2002; Mull 1999; Nichter et al 2004; Oliver-Smith 1996; Pelto 2002; Scoones 1999; Sommerfield et al 2002; Whitehead 1997).

Studies linking vulnerability to decision-making tend to identify the household as the unit pertinent to analysis, as it comprises a consumption *and* production unit in rural and/or mountainous agropastoral societies (Ansell 2006; Haan 2000; Levine 1988:113-116; Netting 1993; Runge et al 2003:15; Scoones 1999), as well as a unit of identity formation (Bell 2004: 83; Stoer and Rodrigues 2005) and joint decision-making (Caldwell et al 1992; Corbett 1988; Rogers 1995). However, numerous other studies note that decision-making occurs at multiple levels, from the individual to village and community levels (DeClerck et al 2006; Ellis and Freeman 2004; Mintz 2002; Murray 2001). Because of the biocultural diversity in mountain communities in the Himalayas, a range of units of analysis have been used there to offer insight into livelihood practices (Orlove and Guillet 1985). Smaller units of analysis offer insights into the role of perceptions in innovation adoption, as well as the rate of adoption (Rogers 1995: 23-4; Jones 1986), while larger units of analysis may be better for understanding population-level influences on decision-making (see Packard 1984). A large literature investigates intrahousehold resource allocation, using the household as a unit of analysis while accounting for variations among dynamics affecting the individuals therein (Agarwal 1997; Bennett 1983; Bledsoe 1995; Deaton 1989; Halvorson 2004; Hendriks 2005; Pike 2004; Pottier 1999; Wilk 1989; Wolf 1990). Because my goal is to understand the role of individual perceptions of vulnerability as well as to compare dynamics at multiple scales in innovation uptake in two villages, analysis of both individual and household-level decision-making in Humla will allow for comparisons within and between villages and households.

Even using a unit for analysis well-positioned to examine multiple scales, anthropological approaches to decision-making about health and reproduction often lack cross-comparative perspectives useful for "addressing the population-level consequences of the meaning structures

that have been so elegantly explained" (Johnson-Hanks 2006: 14). Livelihoods studies arose out of development practice, rather than theorizing, and their methodologies benefit from development studies' practical orientation towards vulnerable people's concerns (Chambers 1992; Chambers and Conway 1992). For this reason, and because the framework was developed as a comprehensive way to measure household vulnerability, the livelihoods literature's five-capitals framework is instrumental to exploring decision-making in Humla. However, livelihoods studies to gain much from the theoretical lineages in anthropology that address the diverse social contexts of decision-making and outcomes (see Haan and Zoomers 2005).

The unique blend of anthropological with development concerns embedded in this project in Humla District demands a similar blend of methodologies. In the next section, I will outline the five-capitals framework for studying livelihoods that forms the basis for my measurement of Humli people's vulnerability. Since my research aims demand a more robust measurement than livelihoods literatures can offer, I turn to anthropological, and sometimes geographical, sociological, public health and economic studies within each "capital" to illustrate ways that anthropologists and other academics can contribute both qualitatively and quantitatively to understandings and measurement of socioculturally-mediated vulnerability at the household level (see Croll and Parkin 1992; Schech and Haggis 2000). After this, I will outline and justify my selection of methodologies, combining approaches from development fields and the social sciences, for the study of technological uptake in Humla District, Nepal. The essay concludes by highlighting the contribution of the proposed methodological toolkit to furthering the study of technological uptake in South Asia and beyond.

THE FIVE CAPITALS APPROACH TO THE DIFFUSION OF INNOVATIONS

Methods for studying livelihoods in development circles coalesced in response to the British government's expressed desire "to assist with implementation [of development]... a way of putting people at the centre of development, thereby increasing the effectiveness of development assistance" (DFID 2000). The Department for International Development (DFID) is the arm of the British Government department whose responsibility is to promote development and reduce poverty (NSSD 2008). The framework DFID uses for this purpose is taken from the work of Robert Chambers and Gordon Conway on food security and livelihoods (1992), and represents a holistic approach to development implementation. Figure 1 offers a schemata for the livelihoods approach, depicting the five-capitals framework that makes up the livelihood assets used to respond to and shape the vulnerability contexts within which households negotiate livelihood outcomes (see Haan 2000; Rakodi 1999; Scoones 1998; Yaro 2004).

The five capitals (denoted by H (human), N (natural), F (financial), P (physical), and S (social) in figure 1) form the core components of household assets and reflect a household's vulnerability to sets of environmental stresses. The methodology outlined below for my research on decision-making in Humla will make some use of the measurements recommended by DFID (2000) for each of the capitals. These measures are described in detail below, along with examples of the ways I plan to use anthropological methods in the DFID model in my research in Humla. Analysis of the contexts and processes involved in creating stress and vulnerability is inseparable from measurement of a household's assets within each capital. As the measurement variables included below indicate, it is also not enough to identify a current state of vulnerability, without understanding the trajectory, or historical embeddedness, of a household and the dynamics affecting its livelihood (Haan and Zoomers 2005). In this research, I will attempt to incorporate such contexts and processes in my measurement of the five capitals qualitatively,

through historical contexts and the observation of interactions among the five capitals at the household, village and inter-village levels. The contributions of multiple fields' methodologies are vital to the richness of data, and will be described in the following sections.

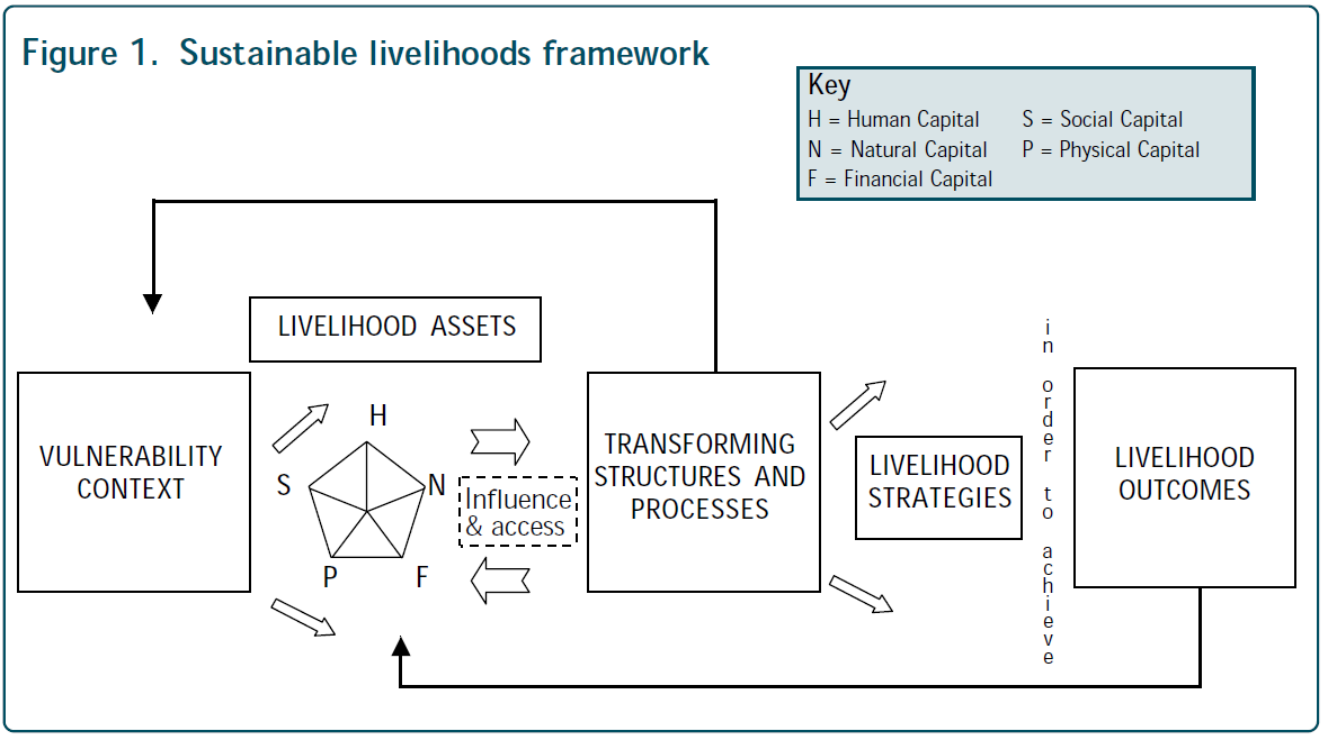

Fig. 1 *Source: DFID 2000*

Human Capital

According to DFID (2000), two indicators of a household's human capital assets are human health and access to knowledge or education pertinent to livelihoods. However, although the DFID model includes health as an indicator, it offers no way of linking health to livelihoods. For my research on human capital in Humla, I frame health in terms of its contribution to productive labor for the household unit, following medical anthropological studies making this

link (see Leatherman 1996, Panter-Brick 1989; Panter-Brick 1993; Panter-Brick and Eggerman 1997). In order to measure health impacts on a household's labor assets, I will measure: the days of labor lost per household to illness in each season of the productive year, wirh a four-week recall period (Russell 2004; Sauerborn et al 1996a), the number of individuals contributing to household reproductive (childcare) or productive demands minus the number of dependents, the number individually seasonally suffering from chronic illness, and anthropometry measurements (see Himmelgreen 2002; Huss-Asmore and Thomas 1988; Tomkins 1994; Norgan 1994), the allocation of time of members of the household to productive and leisurely tasks, intrahousehold food allocation techniques, and the treatment and production strategies used to respond to illness (see Devereux 2001; Kapungwe 2005; Kedia 2004; Johns and Sthapit 2004; Moreno-Black and Guerrón-Montero 2005; Pettigrew 2007:307; Sauerborn et al 1996b; Trostle 2005; Watts 1988). While these, mostly quantitative, measurements will only give a snapshot of human capital and labor resources and responses for households at a given moment in time, they will serve to reveal the variation between households and villages, and seasonally over the course of a year, revealing which households and individuals within them are most susceptible to illness, and how uncertainty levels shift throughout the year, and the consequences of certain household and individual responses to illness (such as treatment-seeking or adoption of health innovations; see Cronk 2004: 86-96; Fratkin 1989; Gross 1984; Johnson 1975; Leatherman 1996; 2005; Munroe et al 1983; Trostle 2005: 68-72 for the value of time allocation methods; see Netting 1993: 270-4; Robbins 2004:9 for costs of technology adoption). Qualitative data will provide information about the context of quantitative information, such as how representative the year of research is of recent production cycles, the kinds of social differentiation affecting access to health and productive opportunities and roles, and the perceptions and objectives framing decision-making

(Anderson and Cook 1999; Fieldhouse 1995; Haan and Zoomers 2005; Hubert 2004; Johnson-Hanks 2006: 20; Pelto et al 2003; Perreault 2005; Stoer and Rodrigues 2005).

People also accrue human capital through knowledge. I will investigate knowledge as an asset quantitatively, through measuring levels and types of formal and non-formal education among households and their members, and more qualitatively, through observation of formal and informal learning mechanisms, and the way they are differentially accessed by members of households, villages, and members of organizations (Anderson and Cook 1999; Godoy et al 2000). I will seek answers to the questions, who controls various types of knowledge at the household and village levels, and what are the consequences of such control (see Agrawal 1995; Nelson and Wright 1995)? For instance, Godoy et al (2000) found that knowledge of the national language predicted technological adoption among indigenous groups in Honduras. This study also showed that knowledge may act to encourage and/or discourage innovation adoption, depending on the types of technologies and information, and the hopes and perceptions thereof (see also Yli-Renko et al 2000).

Natural Capital

"Natural capital is the term used for the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived. There is a wide variation in the resources that make up natural capital, from intangible public goods such as the atmosphere and biodiversity to divisible assets used directly for production (trees, land, etc.)" (DFID 2000). The differentiation between natural and physical capital is problematic, in that it requires an artificial distinction between elusive pristine and human-modified resources from the environment (Butcher 2006). Ecological anthropologists and

political ecologists tend not to recognize this distinction (see Escobar 1999), and reveal some of the biases in the livelihoods approach. This means that in practice, wherever the line denoting natural capital is drawn, physical capital should meet it.

Because of prior knowledge of some of the social arrangements surrounding use of natural resources in Humla, I have chosen to define natural capital as access to the common or semi-common resources negotiated through formal or informal social relationships in Humla. Grazing rights and agreements are therefore an important component of natural capital especially among livestock managers, as are rights and distances to forest resources for fuelwood, construction and medicinal/edible plants, and access to water used for irrigation, cooking and bathing (see Baker 1976; Godoy et al 2000; Mackenzie 2004; Netting 1981; 1995; Thomas 1976). One way to address this artificial natural/physical divide is to first identify where members of the local population themselves draw their natural/man-made divides. If there is an identifiable pattern among the villagers in Humla, I will use it to guide my natural/physical categories of capital.

Financial Capital

"Financial capital denotes the financial resources that people use to achieve their livelihood objectives. The definition used here is not economically robust in that it includes flows as well as stocks and it can contribute to consumption as well as production. However, it has been adopted to try to capture an important livelihood building block, namely the availability of cash or equivalent, that enables people to adopt different livelihood strategies" (DFID 2000). Financial resources in Humla may consist of cash from temporary or permanent jobs, agro-pastoral product sales and trade, remittances from people who have emigrated abroad, and

production expenses, and measurement thereof also needs to take into account a household's debts in the form of bonded labor or cash debts. Measurement of financial capital requires the analysis of market forces acting on people at the individual, household and village level. Information about how a household came to be in their current financial state can reveal much about the processes that continue to shape a household's assets and vulnerabilities. In the diffusion of innovations literature, wealth is considered to have a positive effect on technology adoption, except where there is little or no influence of the cash economy (Godoy et al 2000). In Humla, market influences are present and depended upon, if only by certain segments of the population and to small degrees, so it remains to be discovered whether wealth encourages or discourages innovation adoption.

Physical Capital

"Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods" (DFID 2000), including infrastructure and equipment. This form of capital is therefore what may lead to technology adoption (for productive goals. Human capital may also lead to technological adoption, albeit for health reasons; see Netting 1993: 270-6 for discussion). Tools and equipment, such as timber-cutting machinery, as well as distances to markets and granaries comprise the assets and influences on a household's physical capital. However, because of my narrow delineation of natural capital in Humla, physical capital, for the purposes of this research, will also include household production domains that are privately owned by households, measured by pounds (or kilos) of yield of different varieties of food (including hunger foods), amount of irrigated and non-irrigated land, number of livestock, diversity of livelihood strategies necessary and available for a household's use, the use, timing and rate of

change of those strategies, and months of food security in a given year (see Casimir 1988; Corbett 1988; Davies 1996; Goldstein et al 2003; Himmelgreen 2002; Huss-Ashmore and Thomas 1988; Johns and Sthapit 2004; Maxwell 1996; Thomas 1975; Thomas 1976; Thomas et al 1989; Ulijaszek 2000; Watts 1988; Watts and Bohle 1993; Wheeler and Abdullah 1988). Physical capital is closely related to human capital in that human health is affected in the process of accruing or depleting both. For the purposes of my project in Humla, I will thus measure the food consumption variables in terms of human capital (e.g. intrahousehold food consumption), while measuring the amount of food *available* to a household in terms of physical capital. Much like with all other capitals, information about the historical processes governing livelihood change is key to an understanding of household vulnerability.

Social Capital

Social capital is measured by accounting for "the social resources upon which people draw in pursuit of their livelihood objectives" (DFID 2000), which may include the extent and density of social networks, the status and prestige and other claims drawn from membership in certain social institutions, and the number and types of reciprocal exchanges acted upon by individuals in a household. The interest in social capital as a component of resilience and vulnerability is widespread throughout academic disciplines and has been broached in a number of different ways and with varying rubrics in economics (see Adler and Kwon 2002; Agarwal 1997; Cardenas and Carpenter 2005; Paldam 2002), political science (see Putnam 1995), public health (see Kawachi et al 1997), anthropology (see Anderson and Cook 1999; Cashdan 1985; Perreault 2005), sociology (see Harriss 2002) and development (see Bebbington 1998; Chambers

1992; Chambers and Conway 1992; Ellis and Freeman 2004; Lindenberg 2002; Monge et al 2008).

French sociologist Pierre Bourdieu's (1977) theories on practice and *habitus* position the individual at the confluence of self and culture, structure and agency, in which socio-cultural relationships form the reference points for decision-making. Explanatory models in medical anthropology have used a similar positioning of the individual to explain decision-making about health-related topics (see Kleinman 1980). Some social capital theorists distinguish between internal (level of trust/cognitive) and external (network/structural) social capital (see Adler and Kwon 2002; Landry et al 2002), and bridging (weak) and bonding (strong) social capital (Narayan 1999, Halpern 2005; Osbahr et al 2008). In this way, social capital is seen as something that may either positively or negatively influence technological adoption, depending on the experiences of people in one's social networks, the social networks to which people have access, and the interplay between social capital and other forms of capital (see, for example, Anheier et al 1995).

Amidst dissent about *how* it does so, social science researchers, particularly of business firm practices, have shown that social capital heavily influences decisions made about innovations (Adler and Kwon 2002; Fountain 1997; Halpern 2005; Landry et al 2002; Rogers 1995). In fact, some view social capital as the technology that constructs physical capital (Ostrom and Ahn 2001). In order to understand how participation in reciprocal relationships contributes to technological uptake, I will measure social capital by the number of kin and agnates, and strength of relationship to them (both in terms of degrees of relatedness and social/emotional ties) an individual has within a village, the number of people from whom an individual can seasonally request help with labor (childcare or household production activities),

how such requests will be/have been reciprocated, and type of household partitioning strategies available and used by villagers (see Adler and Kwon 2002). The costs of maintaining strong (versus weak) relationships are often quite high, thus require accounting and comparison with weak relationships that nevertheless incur benefits to participants (Hansen 1999).

In Humla, I will explore relationships between social capital and technological uptake by assessing the (above) contexts of social capital and observing the ways in which technology uptake and usage intersect with social networks and perceptions of trust and efficacy. An understanding of how people are connected to one another in Humla, and thus connected to or excluded from certain resources, will reveal how social resources influence decisions to engage with technologies.

Political Capital

In response to criticisms of social capital measurements that do not account for political affiliations and processes in local communities (Adler and Kwon 2002: 27; Haan and Zoomers 2005; Yaro 2004), I have included a "political capital" in my measurements of household assets and vulnerabilities. Political capital is a way of conceptualizing power accessed by individuals and households for the betterment of their livelihoods, or, conversely, power acting coercively to exclude people from livelihood benefits (Adler and Kwon 2002: 28). Asymmetrical relationships govern the distribution of political capital, and so it is through ranking and ordering the political power of people connected through social networks that allows for its measurement (Adler and Kwon 2002:18-19) In Humla, I will measure political capital through people's level of trust in and affiliation with (through friendships, kin, and/or job sites) the state, as well as with their local village and regional governing bodies (see Dove 2003; Kawachi et al 1997; Korf and

Singarayer 2002; Pimbert 2006; Scott 1987). I will also measure the number and political sway of kin who live in (relatively) urban centers like Simikot, Humla's district headquarters, and Kathmandu, the state capitol, as this may indicate the extent to which villagers can call on political contacts to leverage their material and other goals.

The concepts of social and political assets as "capital" are problematic in that they do not depreciate with use like all the other capitals, nor are they limited resources (Adler and Kwon 2002). Indeed, to some extent the capital designations defined above are all arbitrary and overlapping, but the five-capitals framework provides a heuristic device for researchers of social interactions who wish to understand the relationships between perceived vulnerability and responses to risk occurring through social and environmental relationships. These relationships are reproduced through the actions of individuals within households. The capital categories I have laid out above are mutually exclusive to enable measurement, rather than to denote closed systems. Age, gender, class, caste and occupation are descriptive variables which may explain a great deal of the variability among people's assets, and time spent with the people of Humla in livelihoods activities will only improve an understanding of the ways in which cross-cutting variables are ranked and ordered.

Because it is action-oriented, the aim being to direct social change for the well-being of poor people, livelihoods methodology may not explicitly account for the cumulative interaction of "capitals" and the functions of already-existing local social institutions in resilience and vulnerability (Haan and zoomer 2005). The underlying assumption is that "traditional" behaviors are insufficient to accomplish positive change. Another assumption in development circles is that "poor people" are a static group of individuals in need of help. This victimization of a somewhat

undefined but homogeneous group of people allows livelihoods approaches to ignore varying levels of exclusion and to privilege "expert" knowledge above local knowledge (Haan and Zoomers 2005). Livelihoods methods do not often investigate the impact of development technologies on social contexts, but rather assume that certain development technologies represent an unqualified "good" answering to the problem of underdevelopment in a homogeneous community (Western and Wright 1994). In this and other ways, livelihoods approaches fail to account for group histories and processes affecting responses to technologies, as well as varying local perceptions of technology, social change and vulnerability (Scoones and Wolmer 2002). Despite the "people-centered" focus of the livelihoods approach (DFID 2000; Haan and Zoomers 2005), "culture" merely represents a constraint to be overcome by foreign agents. The livelihoods approach also assumes that people's vulnerability and assets can be neatly quantified and packaged to predict decision-making, without accounting for the competing influences on "rational" decision-making. This assumption glosses the variation in experiences and valuing systems of vulnerability, risk and change, as well as the impact of social institutions on local settings (Haan and Zoomers 2005; Hussein 2002:55). My research attempts to address these shortfalls common to conventional uses of livelihoods methods.

TECHNOLOGICAL UPTAKE IN HUMLA DISTRICT, NEPAL

As described above, the processes affecting technological innovation in Humla District, Nepal are deeply integrated with development. The following paragraphs will reveal how I expect to investigate the mechanisms through which decision-making about development technologies occurs. Combining methods and analytical techniques from the fields of anthropology and development, this research will explore whether and how decision-making

models fit the lived reality of people in Humla District, who struggle to negotiate social and economic demands amidst severe resource-stress.

Hypotheses

Hypothesis 1 (H1): The distribution of resources (measured according to the capitals framework from the livelihoods literature, including human, social/political, physical, natural and financial capital) within a village, in addition to perceptions of risk, determine household responses to the livelihood and health strategies available to them.

Higher status households, meaning those possessing more of the five capitals, engage in less intense, more reversible subsistence strategies, while households in both better and worse standing as measured by the five capitals tend to enact strategies perceived as more costly and irreversible. Kuznar (2001) depicts risk-taking in the form of an inverted bell-shaped curve, with the households in the middle ranges of socioeconomic status taking fewer risks than those of extremely low or high socioeconomic standing. Threshold models represent attempts to define the point at which all household resources have been depleted to the extent that households are compelled to make more potentially costly and irreversible decisions (Leatherman 1996; see Scott 1976; Winterhalder et al 1999; Yaro 2004).

In order to test this hypothesis, positive or negative responses to technologies by households in two villages in Humla District, Nepal, will be compared with each household's standing with respect to the five capitals, and to village perceptions of the costs and reversibility of adopting the technologies. For instance, the hypothesis is affirmed when the lowest status households respond positively to a technology they perceive as very costly.

Hypothesis 2 (H2): Marginalized individuals (particularly women and adolescent males) occupy different roles in decision-making within a household than adult men, and will resist their marginalized role by asserting themselves in negotiations about their part in household strategies.

Principles of social inclusion and exclusion, in addition to perceptions of risk, determine an individual's negotiations about the livelihood and health strategies available to a given household. Methods will relate social status indicators to household members' responses to technologies, input in household negotiations, and outcomes of the negotiations in order to test the impact of social capital on responses to and perceptions of introduced strategies.

Hypothesis 3 (H3): Individuals in households that have been personally and negatively impacted by the insurrection will take longer to adopt new technologies and will describe them more negatively and cautiously than those in households not personally impacted by the insurrection.

The perception of the riskiness of the environment in Humla is greatly impacted by varieties of experience with the insurrection. Some households have lost members due to death or have had their already-insufficient food resources severely taxed by the insurgents' demands. Others have had land and other resources redistributed during the course of the insurrection. The generalized antipathy of the insurgents toward development agencies in Nepal is well known. Direct and negative experiences with insurgents increases some villagers' sense of vulnerability relative to other individuals, and are expected to have a negative impact on their interest in taking on additional risk by adopting new technologies and working in concert with a development organization's staff members

Field Methods

According to analyses of surveys from Humla District conducted in the spring of 2007[7], the greatest sources of stress in the villages are resources such as food, clothing, cash and fuelwood. Financial and natural capitals are therefore under the most strain in Humla, although these stresses will impact the rest of the capitals as they remains constant or increases. Lack of food, for instance, may contribute to the increase in incidences of disease, decreasing a household's available labor, and thus human capital. Indeed, health was the second-ranked category of concern for villagers in Humla. The strength of the five capitals for each household is a product of both the current risk environment and their history of vulnerability, and determines the household's "space of vulnerability" (Watts and Bohle 1993; Leatherman 2005) and ability to adapt to stress. For a household in Humla to be able to adopt the non-governmental organization (NGO) technologies requires not only the availability of the technology and sufficiently low risk perceptions of the technologies by villagers, but the labor and cash per household to procure it (human and financial capital), which may require the shuffling of all five capitals in order to make it available, as in the drawing on social capital to get friends to harvest the crops for the day while the interested parties install and learn how to use their new stoves. The five capitals are fluid and connected, and often exchangeable for other capitals. Therefore, analysis of a household's current vulnerability and ability to respond to risks will depend on categorization of households in terms of their capital frameworks.

General Data Collection: Myself and a translator will spend one year in Humla living in households in the two villages, observing and learning household and individual perceptions of livelihood and health strategies and social roles as a part of the communities. Although I have

7 Dr. Kimber McKay's has been collecting data on the efficacy and effects of technologies on Humli people for several years. At the time of my analysis, of this data 327 households were included in the sample.

worked extensively with health and demographic data from Humli villages, and have taken a year of the Nepali language through the South Asian Summer Language Institute, the expertise of a translator will be necessary for reliable data collection. The translator has worked intensively with my advisor during past research in Humla. The limitations inherent in the use of a translator are well-documented in the literature, as are the contributions to anthropological research nevertheless accomplished through cautious practices, as sometimes it is the only way to conduct a study in which the researcher is not fluent in the dialects spoken (Bernard et al 1986; Phillips 1959).

Participant Observation. Participant observation, documented daily in field notes and transcribed nightly into NVivo, will form a core component of data collection, serving to reveal villagers' perceptions of the new technologies and the process of adapting to them (H2), as well as providing a rich context in which to situate other data and a way of triangulating for greater data reliability (LeCompte and Schensul 1999). Participant observation can also provide chains of explanation for the state of household capitals, as demonstrated in Leatherman's (2005) vulnerability model, by connecting political economic histories and scales that affect a household's ability to make decisions about risks (H1). Technological histories, collected during the first couple of months of fieldwork, will situate the current state of decision-making about the ongoing investment of NGOs in the community, and describe the processes involved in technological change (see Mumford 1961). Technological histories, and learning how to use the new systems from and alongside villagers, will also provide a natural platform from which to approach participants for the study.

Seasonal Surveys. After pilot-testing the internal and external validity and reliability of the survey with a group of key informants (LeCompte and Schensul 1999),three seasonal surveys

will include open-ended questions about the vulnerabilities perceived by villagers (H1/H2), decisions made (by the individual (H2/H3), by the household (H1), and/or by the village committees (H1)) about those (social, financial, human, natural, and physical) vulnerabilities, and perceptions surrounding the new technologies (H1/H2/H3) offered by NGOs (that is, whether to adopt new technologies, and expressions of positive or negative feelings and behaviors toward those technologies; see O'Donnell 2004; Hubert 2004; Sommerfield et al 2002). Mapping the two villages and assigning households within them a random number will allow for anonymous sampling. Because of the potentially drastic fluctuations in food security across seasons due to the reliance by villagers on agrarian products, the seasonal surveys are a necessary component of a study attempting to evaluate the impact of resources on decision-making throughout the year (see Leatherman 1996; Panter-Brick 1993; Thomas and Winterhalder 1976). The two villages in question are small; including a total of 112 households. They are only three hours by foot from each other, so research can be conducted between them easily throughout the year. I will administer surveys with a consenting adult male and female resident of each household in both villages in order to measure villagers' perceptions of vulnerability (H2/H3) and of the strategies available to cope with that vulnerability (H1) (McKay 2002). Because the number of households is small and contact with members of them will be continuous during the year of research, it is reasonable to survey a consenting adult male and female in every household, rather than surveying only a sub-sample of households. This will give as large a sample size as possible and will insure that no householders will feel deliberately excluded from the study, an important consideration in this small community (McKay, personal

communication, 2008). Due to knowledge of past research experience by anthropologists in these villages, the expectation is that villagers will have a high level of interest in participating[8].

Hypothesis 1: Household vulnerability and decision-making

The five capitals measuring household and individual vulnerability will be measured by collecting information about land size and quality, number and type of livestock, cash income, production and consumption expenses, and debts incurred, as well as household size, composition (gender, age and marital status of household members), caste, class and clan, and experience with the insurrection (based on public, well-known, past events). Participant observation, time allocation studies (below) and surveys will each contribute to the collection of these data, each of which will indicate and encompass sample variability and descriptive and or predictive characteristics (human, social, physical, natural and financial capitals). This information will show the position of each household with regard to each of the capitals, allowing a way to compare the vulnerability of households to each other in quantitative analysis. Once the data are collected on the indicators for each capital, categorizations about the relative wealth a household has in each capital will serve as a preparation for analysis (see LeCompte and Schensul 1999; Ott 1993; see also Phillips 2006.)

Hypothesis 2: Individual vulnerability and individual/household decision-making

Health status is an indicator of an individual's social status and ability to fulfill social roles through labor (Leatherman 2005). Information collected from individuals on nutritional intake (via dietary recall) and health status (presence of locally-defined types of disease, and how many days of labor lost due to disease; see Leatherman 2005) will supplement nutritional,

8 My advisor, Dr. Kimber H McKay, has fourteen years of fieldwork experience in Humla District.

allometric, and biomedical health data previously collected in the two villages (see McKay 2002 and McKay et al 2007; see also Martorell 1998; Messer 1984; Mosley and Chen 1984; Ordonez 1984). These data will contribute to the measurement of physical and social capitals, and will be collected in tandem with the seasonal vulnerability surveys.

Time allocation observations will be important for understanding and measuring human and social capital. Information on time spent in reciprocal exchange activities, and time spent in different forms of productive and health-maintenance activities will reveal household vulnerabilities (Fratkin 1989; Leatherman 1996; 2005; Munroe et al 1983). Random spot-check time-allocation techniques track the time-allotment of individuals' activities (Bernard and Killworth 1993; Gross 1984; Johnson 1975), and will be used to ascertain how much time is spent on social reproduction and production, and on the maintenance of informal resource networks (such as labor-sharing, barter, and other forms of social support; see Cashdan 1985; Devereux 2001; Mackenzie 2004; Rocheleau 2005; Webb 2006), and on the cash economy. The data from time allocation studies can be collected in conjunction with other observational and survey data (Johnson 1975). One way to do this is to use a random number generator to come up with a household visitation schedule and not forewarn participants prior to visits. After recording the activities of present members and asking about the activities of absent household members, survey questions, in-depth interviews, or participant observation may follow. Following established procedures for this type of study (e.g., Gross 1984), preliminary observations made during the course of the first month of fieldwork will be used to determine the categories of activities to be recorded, the time intervals needed to accurately reflect the diversity of daily activities in each village, and the sample strata (gender, age, socioeconomic status, etc). Following this period, visitations will proceed among all households in both villages at random

hours of the day during each season throughout the year. These data will indicate which household members are most burdened by livelihood stress, as well as revealing any differences in the labor demands between households of varying socioeconomic statuses or livelihood strategies (human, financial and social capitals).

Hypothesis 3: Impact of the insurrection on individual decision-making.

Data collected on villagers' perceptions of their vulnerabilities and the riskiness of technologies through the surveys and participant observation will contribute to understandings of the impacts of the insurgency on those perceptions, and how these perceptions impact decision-making about technologies.

Data Analysis

Assessments of the five capitals reveal who is vulnerable, and to what degree, to the stresses of Humlis' ecologically, politically and economically insecure environment. Household comparisons will reveal how a a household's assets shift over various seasons, as well as how household vulnerabilities compare within and between villages. Quantitative analyses conducted in SPSS 15 will allow for conclusions about individuals' and households' decision-making patterns in response to real and perceived vulnerability (Leatherman 2005). Qualitative analyses will make use of data collected in participant observation on perceptions and networks available to individuals to define vulnerability in locally-meaningful ways, in order to better understand *why* the decisions about the NGO technologies were made when they were (see Anderson and Cook 1999; Hubert 2004), and to show the consequences of those decisions. Once research reveals connections among vulnerabilities, perceptions, and decisions, it will be more clear to

whom and at what times and ways assistance programs ought to be implemented (Hendriks 2005; McKay et al 2007; O'Donnell 2004; Rakodi 1999).

Hypothesis 1: Household vulnerability and decision-making

Qualitative Analysis: Participant Observation. Each village's political-economic histories may play a role in explaining differences between the two villages, and understanding these histories through qualitative analysis of field notes from participant observation will enrich an understanding of the quantitative analyses described below. The contexts revealed through participant observation will help link the current state of technological uptake in Humla to the historical and socio-political processes that shape villagers' decisions about risks. This background will also provide a local explanatory framework of villagers' perceptions about the NGO technologies and other strategies for coping with stress. I expect to see patterns in which households choose certain types of strategies depending on their position of vulnerability as described by the five capitals. Participant observation and talking to people about what their households have done in the past to cope with differing degrees of stress, will situate the uptake of these technologies, as well as other strategies such as male out-migration, sending children to live in monasteries or with relatives, or choosing political sides in local or national conflicts, in the continuum of strategy intensity (insurance, coping, adaptive, or survival), defined by household consensus. Strategy intensity may then be used in other analyses (below).

Quantitative Analysis: Multiple Regression. In quantitative analysis, independent socioeconomic status and health data in multiple regression with household choices about livelihood strategies, and categorical perceptions about vulnerabilities, respectively, will clarify the strength of correlations between spaces of household vulnerability and risk-taking strategies (Landau and Everitt 2004). For each multiple regression, tolerances of explanatory variables will

reveal the colinearity of variables (Landau and Everitt 2004: 102-6). This data will allow for comparisons of households in terms of the variables describing each capital, respectively, by simply ordering the households in relationship to each other, or subsuming each household in an ordinal degree of each capital (e.g. low, medium, high values of, say, social capital, as measured by the amount, connectivity, diversity, equality of, and time allocated to reciprocal exchange relationships), as well as using the indicators of certain capitals as the independent variables. Time allocation data will reveal the impact of various sources of stress on a household, such as time spent foraging for firewood, time spent on food production, and time spent seeking health care or tending to sick family members. For example, a household with chronically sick members who cannot work would score lower in human capital than a household without chronic sickness. The expectation is that households scoring higher in human capital will be more receptive to innovation than households scoring lower in human capital. Thus, using adoption of the technologies (either yes/no per household, and, in separate analysis, positive or negative attitude toward the technologies) as the dependent variable, multiple regressions with the strength and indicators of each of the capitals (as independent variables) will reveal the most influential capitals involved in decisions to accept and perceptions of the technologies.

Villagers' perceptions of each household's socioeconomic status (again: low, medium, or high), and of the degree and kind of risks facing them, will be additional independent variables in regressions. Because perceptions are individual in nature, choices about the overriding perception of risk within the household will depend on the results of participant observation of intrahousehold negotiations, and individuals' perceptions will be addressed in analysis of individuals' perceptions and negotiations within the household (see Hypothesis 2).

Results may reflect what Kuznar predicts, that the villagers' perceptions of socioeconomic status will be most highly correlated with uptake of technologies. On the other hand, disease or perceptions of political danger may play an overlooked role in decisions to engage with technologies, revealed in the higher predictive power of human capital or perceptions of risk, respectively, in regression with technology uptake. These results would point to arenas for intervention or reveal the impact of political turmoil on decision-making among households, nuancing the hypothesis based on Kuznar's curve.

It may also prove possible to use the intensity of other household strategies (insurance, coping, adaptive and survival) as independent variables, doing multiple regressions with each and using the capitals as dependent variables. Regressions using strategy intensity will reveal which deficiencies in capital contribute the most to the use of each intensity level of strategy, helping to identify the vulnerability thresholds below which riskier (e.g. survival) strategies are consistently employed, and in what capitals those thresholds exist. For instance, regressions may show that households lower in social capital choose adaptive strategies the most, while households using survival strategies are equally vulnerable in all five capitals. In this way, I may find that some capitals are more influential at different stages of household vulnerability. Through multiple regression, I may also find that strategy intensity is a good predictor of a household's adoption of technologies.

T-tests. To compare the two villages, I will treat each village as an independent sample in T-tests using the same variables described above to determine which area (of the five capitals and perceptions of vulnerabilities) accounts for the biggest difference between the villages. Perhaps the villages will differ most in their collective financial and social capitals, or perceptions of risk and vulnerability will play a larger role than observations of village capitals.

Any of these results would unpack the role of socioeconomic status, which Kuznar uses to explain decision-making about risks, and test the strength of the sigmoid curve describing risk aversion.

Paired samples t-tests will be useful for comparing household vulnerabilities across time, to see if the fluctuations in season are a plausible explanation for any patterns in the seasonal acceptance of technologies, assuming I can collect data on the timing of each household's acceptance of the technologies.

Hypothesis 2: Individual vulnerability and individual/household decision-making

Qualitative Analysis: Participant Observation. Qualitative analysis using NVivo will allow for analysis of textual data from fieldnotes, based on participant observation. Using his approach, revealed markers of the social status of individuals within the household will determine the variables to be used in quantitative analysis. Participant observation will also reveal the processes that underlie household negotiations about technologies and the ways that social status and other factors impact individuals' roles in adopting, maintaining and integrating them into the household. Personal narratives about their place in the household will influence how vulnerably they perceive themselves and their households in relation to new strategies, such as the NGO technologies. I will also be able to observe and compare the perceived riskiness of the various resistance strategies employed by dissenting individuals in order to understand, through quantitative analysis, how status influences risk taking among individuals.

Quantitative Analysis: Multiple Regression. Social status markers (e.g. gender, age, score on time allocation to labor, health status) will be the independent variables in a series of multiple regressions estimating individual decisions about and perceptions of the riskiness of the new technologies. First, I will use status markers to predict perceptions about the riskiness of NGO

technologies, as well as any other strategies identified in qualitative analysis, to see whether lower status individuals see new strategies differently than higher status individuals, controlling for the level of risk in which an individual sees oneself. This analysis will also show where the technologies stand in the risk perceptions of villagers. In other regressions, status will predict the use of the resistance strategies identified in qualitative analysis, such as resisting technologies (vocally or actively). These analyses will reveal whether lower status individuals tend to choose riskier or less risky strategies to manage their roles in the household. I will also use regressions to see whether perceptions about an individual's level of vulnerability are estimable by his/her social status.

Hypothesis 3: Impact of the insurrection on individual decision-making.

Qualitative Analysis: Participant Observation. Through the stories villagers tell about how the conflict entered and continues to affect Humlis' lives, its role in decision-making will become clear. I will investigate the processes by which disruptions in the two villages were incorporated into existing social fabrics. These observations of villagers' perceptions and coping strategies will serve as the basis for quantitative analysis of the impacts of the insurrection on decision-making, as well as a way to connect Humlis' experiences of conflict to the national upheaval and its broader political economic import.

Quantitative Analysis: Multiple Regression. Multiple regressions will test the idea that past traumas impact present and future decision-making adversely. The impacts of the insurgency on individuals (on a scale from least to greatest) will predict villagers' reception of the technologies if the correlation is significant. If, for instance, those most greatly influenced by the insurrection were also reticent to adopt technologies, these results affirm the hypothesis.

The methods described here enable a comparison of the differences between the two study villages and among households within them, parsing decision-making in the present and from the time that villagers first learned about what NGOs in Humla had to offer. Because some of these NGOs are still working in the two villages, direct observations of the decision-making and implementation of the technologies are possible, although some degree of reliance on villagers' historical accounts is unavoidable. As such, these fall short of ideal research settings, since recall of events is often imperfect. However, since perceptions of past occurrences may prove to be just as strong an influence on future decision-making as what actually occurred, and work with human subjects in general is rife with such drawbacks, this setting still offers an excellent opportunity to research the factors influencing human decisions in an environment of risk. The small sample population under study affords an opportunity for observing and analyzing significant differences in resources, attitudes, and behavior, but in deep, fine-grained detail.

Ethics

I have worked extensively with The University of Montana's Internal Review Board (IRB) to ensure the protection of individuals involved in this research, and this proposal has received the IRB's full approval.

Before conducting research, I will obtain signed consent to conduct research from the Village Development Councils (VDCs) in each village, if possible. Because many of the villagers are illiterate, the translator and I will adhere to a spoken consent process, by which the project aims and procedures, potential risks and discomforts, and voluntary participation will be explained for each individual involved in the study. After this, spoken agreements will signify

informed consent. In the case of children becoming involved in the study, as during observation of their input in household decision-making, parental consent will precede data collection.

In order to protect the confidentiality of the subjects, no names or other identifying information will be used or recorded during the course of the study. When collecting data about perceptions of the Maoist insurgency, the I will obtain data only on events in villagers' pasts and on common knowledge of the insurgency. For reporting purposes, pseudonyms assigned to both villages and the individuals surveyed will help protect participants' privacy. The translator and myself will maintain an informal distance from association with NGOs and the VDC in order to reduce bias in the research.

CONCLUSION

The livelihoods literature methodologies carve out a framework for positioning social actors in their decision-making contexts, thus contributing a great deal to research on technological adoption in the context of development. The five-capitals framework identifies contexts of vulnerability people navigate in order to even think about taking on new risk or addressing latent risk through technologies with which they are unfamiliar. Both before and during Nepal's recent revolution, adopting new technologies offered by development organizations was a risky proposition. New methods of cooking, heating and toileting introduce villagers to risk on many levels. Included among these are issues such as the risk of additional work and physiological stress when villagers are already malnourished and over-worked (McKay 2002, 2003), the chance that new systems would fail at a time when old systems cannot be recovered (Zahnd and McKay 2005), and, more recently, the risk of scrutiny by insurgents as a result of consorting with outsiders (McKay et al 2007). In the theoretical literature on risk, poor,

rural householders like those in Humla are generally presumed to be risk-averse because of low socio-economic status and the unpredictability of their mountain environments, although this assumption has been critiqued for over-simplification (Allub 2001; Ansell 2006; Escobar 1995; Ferguson 1994; Henrich and McElreath 2002; Rogers 1995). While links between socio-economic status and risk have been explored, few studies incorporate other markers of social status and social capital into models predicting tolerance of risk. When, as in Humla, households are composed of individuals with varying roles, statuses, and vulnerabilities, socioeconomic status alone cannot sufficiently explain the variability among individuals as they attempt to cope within a failing socio-economy. The framework provided in the livelihoods literature, aided and abetted by anthropological methods accounting for perceptual influences on decision-making, goes a long way toward remedying these lacunae in the risk literature.

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The Search for "Strong Medicine": Pathways to healthcare development in remote Nepal using GIS

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Abstract: Nepalese agropastoralists' confrontations with forces of change in the last generation have altered villagers' abilities to gain access to health services, clean water, and nutrition in Humla District, Nepal. Development efforts and Nepal's recent armed conflict, in particular, introduced novel technologies and ideologies that a sub-section of villagers have responded to in a fashion that we did not expect. In this paper, based on theories about the diffusion of innovation and risk, we argue that together, villagers and other change agents have co-created new contexts of vulnerability in the post-conflict setting of rural Nepal, as observed in remote Humla District. Using ArcGIS to represent landscapes of health and health-seeking behavior, we explore the integration of neoliberal health development in this post-conflict setting in which medical pluralism, caste, Hinduism and cultural conservatism all shape decision-making. Based on in-depth and long-term research conducted in the region over the past fifteen years, we describe the strengths and weaknesses of GIS as a tool for enhancing our understanding of this 'health landscape'. In Humla, topography is a major determinant of access to health care. Our analyses reveal interesting relationships among health, culture, and vulnerability, and provide insight into directions for future health interventions in similar contexts elsewhere.

Keywords: Health, Healthcare seeking, development, GIS, vulnerability

Introduction

In countries throughout the Global South, healthcare development has been neglected by failing governments and bequeathed to a patchwork of non-governmental organizations (NGOs) funded by international donors (1-2). NGOs provide essential services that would otherwise leave masses of people without basic tools of survival, e.g. sewage disposal, nutritional supplementation, and medicine. However, the uncoordinated efforts of many NGOs, their emphasis on neoliberal values, and lack of oversight provoke many criticisms. In remote parts of Nepal, villagers struggle to receive adequate healthcare despite the ever increasing numbers of NGOs providing services in the region. Reasons for this gap include external issues, such as the mountainous terrain that precludes the building and maintenance of extensive healthcare infrastructure, and internal issues of inappropriate program design and low levels of trust between organizations and the communities they serve (see 3). With the help of GIS imagery and analyses, this paper reveals the ways in which the natural and human-made landscape shapes access to healthcare in Humla. It uses a microanalytical framework to reveal information not

often available in the literature. We posit that the interactions between local people, outsiders and the landscape help to determine who gets access to what health resources, with some surprising implications for the relationship between health and socioeconomic status in rapidly developing regions like Humla District. Using GIS-generated imagery, we show that wealthier people *do* have better access to healthcare resources, but, due to complications of the transition to a new healthcare seeking regime, better access to health services does not necessarily lead to better health outcomes. The results point to ways in which healthcare development agents can improve service delivery in remote, rapidly developing regions.

The villages in the fieldsite are located twelve kilometers from the district capital in a roadless Himalayan valley in northwestern Nepal (Figure 1). The fieldsite includes two villages, Paschimgaon and Uttargaon, of similar size whose inhabitants belong, for the most part, to the second-to-highest ranking Hindu caste in the Nepali caste system (the *Thakuri jaat*). A census we conducted in 2009 and 2010 revealed that Paschimgaon had a population of 420 individuals in 67 households, while Uttargaon housed 386 people in 61 households (see Figure 2; pseudonyms have been used in place of village names). Despite a community health model instituted in the late 1970s by the Nepali government and the intense activities of governmental and non-governmental aid organizations in the region since the early 1990s, villagers' sicknesses are still what the medical community characterizes as "preventable" (4-5). Like many people living in rural regions of the developing world, Humli villagers typically suffer from infectious diseases that have been largely eradicated in the developed world. Tuberculosis, polio, and leprosy affect villagers, along with a variety of respiratory and food- and water-borne diseases that result from a combination of indoor air pollution from cooking fires and lacking hygiene and sanitation technologies. Water and food sources are contaminated with protozoa, viruses and/or

bacteria, and villagers struggle in every season with diarrheal and respiratory diseases that contribute to infant mortality, days lost from work, and other morbidity and mortality (Table 1). Injuries resulting from landslides and falls on steep mountain paths are other frequent occurrences in Humla District, and are usually attended to within the village. Respiratory infections account for a large proportion of morbidity and mortality, and are caused or worsened by poor ventilation and indoor cooking fires, combined with poorer air quality at high altitudes and local smoking habits. High and physiologically taxing labor demands resulting from a livelihood that relies on production from agriculture, trade, and livestock-raising seem to exacerbate the burden of disease in this population, particularly in the planting and harvesting seasons (6-7).

Nearly half of the complaints for which we were able to collect healthcare seeking data were for acute gastrointestinal (GI) difficulties, most likely the result of bacterial and viral infections contracted through food and water contaminated by livestock. Healthcare decisions for GI problems were similar to overall healthcare seeking, in that the first response was typically to send someone in the household to get drugs from a nearby health clinic or a pharmacy in the district capital, Simikot, twelve kilometers away. Herbal treatments of GI problems took a slightly higher third place among first treatments than that for sicknesses overall (see Table 2). The period of time people waited to seek a first line of treatment was also fairly consistent across sickness categories, with the majority of first treatments occurring within the first three days of sickness.

As of 2010, one public hospital in Simikot served all inhabitants of northern Humla. It was irregularly staffed because the doctors posted by the government to work in Simikot tend to spend a considerable amount of time outside of Humla District (see 8-9). This means that under-

trained staff are generally responsible for diagnosis and treatment, so the quality of care Humlis can receive there is quite low. A private institution with more funding, equipment, and supplies is nearby, with new facilities and the only x-ray machine in Humla, but anecdotal evidence suggests that most Humlis view the cost of treatment there as prohibitive, and the hospital is often empty. The government health clinic infrastructure remains, consisting of health posts in more-or-less every other village, either completely locked up and devoid of equipment and medicine, or staffed by untrained health volunteers who dispense whatever medicines are available. A few non-governmental organizations have instituted clinic systems in attempts to fill in the holes in government coverage.

The Thakuris of northern Humla identify as high-ranking members of the Nepali Hindu caste system, but their religious practices more closely resemble animistic, ancestor-centric religions practiced by their ancestors who migrated to the Himalayas from India's Gangetic plain over 500 years ago (see 10-14). In addition to the difficulties of access to healthcare services in an environment characterized by scarcity and unpredictability, healthcare seeking patterns in the region are complex, due to pluralistic healthcare seeking practices resulting from the syncretism between Buddhism and Hinduism (15) and, more recently, from the introduction of biomedical systems from the western world (see 16), and the Maoist conflict (1996-2006) that made travel for treatment unsafe and more costly (8, 17).

Villagers respond to development workers and their programs in complicated ways. On the one hand, rural villagers often have reputations for being among the most "backward" of all Nepali citizens (see 18) and wish to become "developed". On the other hand, the organizations that have requested their labor in programs have fulfilled few of their development promises (3). When the workers leave and the projects end, NGOs often neglect the unfinished or broken

irrigation systems, greenhouse projects, or orchards that are difficult to maintain locally and relegate villagers to a more precarious position than when the projects began. Paired with their long-standing disenfranchisement from the government, this situation has made villagers suspicious of outsiders in general (19-20). This was one reason Humlis gave for viewing both Maoist combatants and NGO workers with similar reluctance during the war- both of their claims and concerns were equally foreign, difficult to evaluate, and sounded a lot like the failed promises villagers had heard before.

Despite this ambivalence, most villagers in the fieldsite wanted Western medicines to treat their sicknesses, but often could not afford the money, time, and/or risk of failure the use of local healthcare services entailed. Local alternatives included herbs and *dhamis*, or shamans, who heal through their contact with ancestral spirits. Humlis often use traditional treatments in combination with biomedical services. As a result of the aggressive development programs implemented in this part of Humla by western-based organizations, though, the two most popular healthcare seeking strategies among villagers in the fieldsite involved the procurement of biomedical services. Biomedical drugs are considered the strongest (“s*abanda kadaa”*), or most powerful, of available medicines (see also 21), and the most difficult to access. Even the nearest government village health clinic was nearly two hours away, unpredictably staffed by a poorly trained health worker and stocked with a bare minimum of supplies. Going there meant that one or two members of the household took a valuable half-day away from the fields to arrive at a locked door. Alternatively, sick people walked twelve kilometers and climbed 1500 meters in elevation to the hospital or a pharmacy in Simikot (Figure 3). Doctors from urban regions of Nepal spend two-year stints in rural hospital postings, but they are usually posted far away from their homes and have little incentive to invest a great deal of energy in the temporary posting

(22). Depending on how sick and/or persistent a person is, villagers might spend several days awaiting treatment or medicine in Simikot.

In mountain ecosystems, elevation, rough terrain, livelihood systems, and climate change may make decisions about health, among other concerns, contingent on the season, especially where agriculture forms the basis of food security (23-24). If it is harvest or plowing season, time constraints on healthcare seeking are an even greater issue, often delaying treatment processes beyond the critical period (25). Because villagers are so dependent on labor-intensive economic pursuits, health-seeking in remote areas often involves tough sacrifices on the part of the sick person and their family members (26-27). In this fieldsite, we found that labor demands associated with agricultural seasons often dictated the kinds of sicknesses people experienced, as well as their decisions about treating sickness.

In Humla, kin networks have traditionally been the main source of social support. Social networks (i.e. friends and family) reduce vulnerability by providing material and emotional supports, additional caretaking, and relief from labor burdens that prevent undue stress on the body (28). They may also enhance vulnerability and sickness by creating social exclusions that bar access to important healthcare resources (29-32).

When NGOs enter the vulnerability equation, additional dynamics may affect the social and material resources available. NGOs tend to espouse neoliberal ideologies that emphasize individual-level decision making about economics and healthcare. The social networks interacting with NGO programs and workers begin to shift as a result of these influences and the changes in mobility and economic structure that often accompany NGO-led development (33). Economies tend to become more cash-based, and certain people are better-positioned to enter

into novel economic relationships and pursuits (34). Here, we explore possible associations between social networks, development, and health vulnerability in Humla.

Geographical information systems (GIS) revealed patterns in terms of kinship as well as seasonality, otherwise obscured, that appeared to be related to health vulnerability and healthcare seeking. When we combined social features with GIS in new ways, patterns emerged that revealed a gap between health services and health outcomes in Humla District. Sickness and the ways in which villagers confront it are conscribed by the seasonal, topographical, and policy dynamics characteristic of remote developing world contexts. The ways in which these dynamics influenced individual decision makers in shaping health landscapes in Humla form patterns discernible via GIS at the level of microanalysis, and revealed a healthcare seeking transition that left unexpected segments of the population vulnerable to poor health outcomes.

Methods

The results presented here are primarily based on fieldwork conducted in 2009-2010 by the first author, supplemented with ethnographic information from the authors' combined 17 years of experience in the region that provide explanation and context for the statistical findings. In IRB-approved 2009-10 fieldwork, the first author conducted 308 surveys among male and female members of the 128 households comprising the two villages, Paschimgaon and Uttargaon. Surveys measured attitudes toward development projects and processes in the fieldsite, adoption of said programs, and villager vulnerabilities in terms of access to a broad range of resources, including cash, agricultural productivity, labor, health, social supports, and natural resources. Paschimgaon had a reputation for being particularly reluctant to engage with development programs. Uttargaon is located nearby and is one of the few villages in the region of similar size, ethnic make-up, and religious observance to Paschimgaon, allowing for

comparisons that might reveal underlying causes for Paschimgaon's conservatism. Surveys were conducted in three separate seasons (harvest, winter, and spring) so as to take into account nutritional and workload variation, and they measured villagers' material and social resources, health and healthcare seeking behavior, and attitudes about development. In addition, key informant interviews, participant observation and many informal conversations with villagers during a year of fieldwork in the villages yielded much about the attitudes and day-to-day challenges and opportunities villagers confronted when dealing with health issues.

A Garmin eTrex Vista HCx GPS was used to generate data for remote sensing, since this region and the features that comprise healthcare seeking in Humla lie outside the limits of adequate GIS satellite coverage. User Equivalent Range Errors averaged 12 meters during use in the field. Treatment pathways and kin relationships were processed using geodetic lines to represent relationships between two points with geospatial attributes (information retrieved on September 6th, 2012 from : http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//0017000000tv000000). In order to produce a map that shows a network of connections among sets of these pathways/relationships, household locations were digitized in ESRI's ArcMap 10, using a Worldview 1 image base layer, and their associated distance and latitude and longitude locations attached to the kin network and treatment data sets. Using these locations to define the start and end of a treatment pathway or kin relationship, ArcMap's XY-to-line tool created connections between households that match the pathway or relationship of that household as defined in the input table. These connections were further summarized using custom categorical symbols within ArcMap to help make inferences about pathways and relationships. After consideration of some of the other ways of connecting points in Arc, we chose the XY-to-line tool because it creates a variable for the distances between two points, as well rendering visible the social patterns observed in the field. Judging from a review of the literature and the reactions

of the GIS specialists with whom we consulted, we are pioneering this particular technique of portraying social relationships in ArcGIS.

Analyses and imaging in ArcGIS were supplemented by statistical analyses of the relationships between health and socioeconomic status (SES) indicators conducted primarily in IBM's SPSS version 20. Because we were using ArcGIS in innovative ways in order to reveal social network features and their impacts on decision making, we consulted with several GIS specialists and experimented with a few ways of modeling the data in ArcGIS. Where ArcGIS images were less informative, we used Google Earth to represent information about pathways to treatment. The combination of ArcGIS, SPSS, and Google Earth provide unique insights into healthcare seeking in this region, where the mountains and the topographical constraints they pose so heavily influence people's day-to-day activities and access to the services provided by NGOs and the government.

Village-Level Variation

Despite their physical proximity to one another and many other demographic and cultural similarities, the two villages in the fieldsite varied in several important ways. In this paper we examine these and other differences in terms of what they reveal about development processes and health determinants and outcomes in this Himalayan enclave. Due to the poverty, remoteness, and traditional nature of the cultures beset by rapid development processes, these findings will also shed light on healthcare development in the Global South more broadly. Microclimate variability is quite common in mountainous regions like this one, due to the extremes of topographical variation and impediments and access to resources existing within a few kilometers of one another (35). Different microclimates characterized by local geological

and topographical features may pose varying challenges to health access for individuals inhabiting them.

Paschimgaon, unlike the other villages in upper Humla, has flatter, expertly terraced and irrigated lower fields used to plant and harvest a variety of red rice unique to the region. This highly nutritious red rice is essential to many ceremonies among the Thakuri caste in Humla District. Because Paschimgaon villagers own the only land capable of growing this crop, many of these villagers harbor a considerable amount of pride about their ability to grow and furnish their ceremonies with it. In contrast, Uttargaon villagers have access to the least fertile, steepest, and most dispersed agricultural fields, making food security a constant stress for inhabitants.

Beyond their way of earning a living, Paschimgaon villagers are considered more traditional than their neighbors. Their traditionalism may result from their relative geographic isolation (Paschimgaon is bounded on three sides by waterways and chasms that protect their land and forest resources from encroachment by other villages), or could be due to their relative agricultural success. Paschimgaon villagers venture outside of their own village less often than residents of Uttargaon, and form a more tightly-knit community (Figure 4). Because of this, they are perceived by other villagers and by NGO workers as conservative and averse to progress. Indeed, Thakuri people from the surrounding villages and sometimes from Bajang and Bajura Districts came to Paschimgaon to learn words to the old folk songs performed during important ceremonies. But Paschimgaon's traditionalism was not always positively heralded. NGO workers often used the word "lazy" as a proxy for their resistance to NGO programs. Paschimgaon did have significantly more residents with disabilities compared to neighboring villages, and outsiders sometimes used this visible disadvantage as an indictment against both the lack of modernity in the village and residents' ability to care for each other. By and large, the negative

reputation of Paschimgaon was exaggerated by outsiders, if not completely contrary to what we observed in fieldwork.

Instead, our data revealed that Paschimgaon villagers suffered significantly fewer gastrointestinal and respiratory sicknesses than Uttargaon villagers across seasons (Table 3). Uttargaon villagers had significantly greater sicknesses in every season than their neighbors across the Karnali River, possibly the result of their more intense farming labor requirements, nutritional deficits associated with their poor land quality, and their practice of conducting extensive, far-flung trade activities (cf. 36 for a similar situation described among the Garhwali). Uttargaon villagers invest many hours of work to access and plow their poorer quality and un-irrigated fields, only to have mediocre crop yields at best. Remote sensing revealed that the two villages had comparable landholdings, but Uttargaon's fields were on slopes steeper by almost a factor of two, and spread out over about twice the area of Paschimgaon's landholdings. Difficult mountain landscapes force people to be more flexible about preventing sickness and procuring necessities (37), so Uttargaon villagers are more integrated in businesses resulting from trade with China, and more open to development projects that may reduce health stresses. Uttargaon is home to the only secondary school in upper Humla and tends to receive more attention from development agents.

Outsiders often assume Uttargaon villagers are healthier due to the lower rate of disability there, and to the fact that, in focus groups, Uttargaon villagers perceived themselves as having higher overall socioeconomic statuses (SES) than that of Paschimgaon villagers, when in fact their food security and health outcomes, measured via surveys during 2009 and 2010, were worse. Aside from disadvantages in terms of health and soil quality, Uttargaon villagers had better income, education, technological development, and perceptions of their own economic

status, and fared better in terms of SES (SES was a weighted measure of each household's landholdings, food security, labor and education assets, livestock resources, cash and kind income, and social resources; see 38-40), based on our analyses of survey data. In sum, Uttargaon is worse off in terms of health and land, but better off in terms of development and income (Tables 3-4).

Sickness indicators measured by surveys tended to increase as SES decreased, but, when the economic concerns of a household competed with individual health concerns (e.g. a sick household member's choice between seeking treatment in another village and sowing the fields), individuals usually prioritized economic concerns. Ethnographic evidence during long-term fieldwork suggests that health concerns were viewed more fatalistically by villagers than economic endeavors were. This perspective is often viewed as biologically irrational, but makes sense economically and is corroborated by other research in South Asia (24).

Village-Level Healthcare Seeking

Using GIS, we mapped villagers' pathways to treatment. This approach revealed the consequences of decisions about healthcare in two villages with different access to resources and different levels of engagement with development organizations. From 630 sickness episodes recorded in 2009 and 2010 fieldwork, we analyzed 257 household healthcare seeking decisions in ArcGIS and statistical software programs. Decisions about when and how to treat sicknesses were usually negotiated at the household level. Because of the rough terrain, lack of infrastructure, and general scarcity of healthcare and other resources in Humla, these negotiations depended on a variety of factors, including how many people were available either within the household or outside of it to engage in healthcare seeking, what other demands competed for villagers' time and cash resources, the type and severity of sickness, which

members of the household were affected, and people's beliefs about the best option for healthcare. These factors played out differently in the two villages.

The most significant differences in healthcare seeking decisions between the two villages concerned the intensity of treatment. In Uttargaon, household decisions about the first method of treatment for a given sickness were, by and large, much riskier, in that they involved travel over greater distances to biomedical medicine healthcare facilities that had more equipment and charged more for treatment (Table 5). Figure 5 reveals the differences in healthcare choices between the two villages. With the exception of air travel to treatment in the Nepal-Indian border town of Nepalganj, all travel was by foot and often involved sick people themselves walking unaided, often at even greater cost to their health. Paschimgaon villagers preferred using only one treatment at a time and preferred to seek treatment locally, either in health clinics or with local herbs or *dhamis*, to the more costly treatments available farther afield. This is a classic pattern of risk aversion expected among "peasants" in remote places with scarce resources (41-43).

In comparison, Uttargaon villagers' treatment decisions more closely resemble a group of people who are in what we would call a healthcare seeking transition. This transition appears to be the result of the degree to which they have been affected by neoliberal economic reforms. As Uttargaon villagers have ventured out of their village in search of economic opportunities along the path to China and in urban centers in Nepal, they are often paid in cash that they can exchange for processed foods, medicines, and other goods and services. Humli villagers are paid for road work in both cash and kind, i.e. with white rice donated by the international community to the World Food Program that manages a road-building project in upper Humla. Humli villagers are aware that the white rice they receive from international donors is of a lower

nutritional quality than their own millet, red rice, amaranth, wheat, and barley crops. They feel they have little choice in the matter, because their agricultural yields are on the decline due to soil erosion and nutrient leaching, increasingly unpredictable weather patterns, and emerging crop diseases. In addition, Uttargaon villagers' engagements with neoliberal economic development have precipitated a shift in the social organization of that village, which is reflected in their diffuse and geographically extensive social networks, as seen in Figure 4 (see 44). Men are the ones who earn cash outside of the village, for the most part, and cash resources typically are not subject to the group management that, for instance, land and cattle resources must be (45), so decision making and travel outside the village have become more individualized in Uttargaon. We saw that Uttargaon villagers were more likely to pursue work outside of the village and that they vigorously pursued social, economic, and political connections in urban areas of Nepal and China. This does not mean that Uttargaon villagers have thrown off the values they associate with traditional kin groups, social exchange, and support, but that they are mobilizing them in new ways in order to adapt to the increasing scarcity of resources at home.

Though worse off in terms of locally available food and water resources, Uttargaon villagers' higher degree of engagement with development processes prepared them to respond individually and with alacrity to modern healthcare systems. In Humla, these systems are built on cash payments, and patients travel farther than other Nepalis to access healthcare services, and once there, have to contend with treatment courses based on western values of equality, individuality, and self-sufficiency. Simultaneously, changes in social and economic factors seem to have set Uttargaon villagers up for worse health outcomes in the first place.

The theory of epidemiologic transition (46) posits that, as populations become more developed and gain local industries and extensive healthcare infrastructures, infectious diseases

decline while chronic conditions arise. Even within this health microclimate, we found that during 2009-2010, Uttargaon villagers suffered more chronic sicknesses than Paschimgaon villagers (Table 6). Evidence suggests that increasing rates of sickness in this transitioning community is due to lack of proper nutrition, diet diversity, and labor increases during the interim period before the healthcare infrastructure can catch up to economic reform. In this way, Paschimgaon's "risk aversion" may shield those villagers from the negative health effects of this transition, while also putting them at a disadvantage in terms of economic futures in a rapidly developing region.

Socioeconomic Status and Health

With the help of GIS, we observed the ways in which seasonality and geographical features influenced health vulnerability and healthcare seeking. In general, the wealthier the households of upper Humla, the less sickness they experienced (Figure 6). However, male sicknesses tended to be distributed more evenly across socioeconomic classes than that of females (Figure 7). Female health in Humla is more dependent on wealth than male health, since females tend to be more confined by Hinduism-influenced social roles connected with class status. They also have less freedom to pursue economic opportunities and less access to the individualized distribution of resources that cash entails. In the political meetings in the villages at which women were present, male expenditures on gambling revenue, alcohol, and cigarettes were the most common female complaints, and in interviews, women were often unaware of how much their husbands were making and/or spending on such leisure activities (10% of their total expenditures, on average).

Households with more adult producers had better health outcomes. Since multiple males in traditionally agro-pastoral households allows for simultaneous participation in agricultural duties at home, trade endeavors afield, and other business engagements, male and female members of multi-male households experience fewer labor burdens and greater prosperity than single-male households (5). Households with higher male-female ratios had fewer losses from sickness during labor-intensive agricultural seasons. Likewise, higher worker/dependent ratios correlated significantly with fewer female sicknesses in the harvest season, demonstrating the seasonal labor-health contingency for households in Humla District (Table 7). However, even single-male households with lower worker-dependent ratios were often forced to send males outside during strenuous agricultural seasons, and the strain on their labor resources resulted in poor health outcomes and, in turn, increased burdens on the household's ability to produce food (Table 8).

While better health outcomes were associated with larger and better quality fields overall, women's labor was disadvantaged by large and dispersed lands (cf. 47). GIS calculations showed that members of households with larger landholdings had significantly longer distances to travel to fields. Larger landholdings meant more female sicknesses in the non-harvest seasons, and fewer in the harvest season, suggesting that demands associated with intense agricultural seasons in the Himalayas forced women to work even while they were sick (Table 9).

Enhanced by the information GIS reveals about workloads and health across space, these results suggest that outside earned income, more central to Uttargaon livelihoods, operated differently than other indicators of socioeconomic status in health outcomes and decisions. Higher income correlated with the use of cost-intensive first treatments (Table 10), meaning Humli villagers with more cash resources were able to pursue more treatment options than the

villagers who had less cash on hand. However, the relationship between labor, topography, food production resources, and health in agriculturally-based societies is complex. ArcGIS analysis showed that in Humla, more fields means more travel to dispersed parcels. People who traveled farther to their fields tended to wait longer before attempting a first treatment of sickness (Table 11). Seasonal agricultural concerns were often prioritized above health treatment, especially among those households that depended more on agriculture for their livelihoods. Indeed, Humlis who prioritized nutrition and food (preventative healthcare seeking via agricultural work) fared better than their neighbors who prioritized treatment. GIS imagery makes explicit Humlis' healthcare seeking rationale: topographical and resource variations were associated with different choices about treatment, and demonstrate the difficulty of health access in the district.

Social Resources and Healthcare seeking

The importance of other human beings in both healthcare seeking and health outcomes, beyond the individuals experiencing the sickness episode and beyond the marital union, is a central theme revealed by the Humla health landscape. We have discussed the ways in which a) healthcare development has been geared toward the individual, and how some Humlis are taking advantage of this bias in service delivery while others are not, and, b) how other members of the household may directly influence the healthcare seeking process. We continue and extend this conversation by exploring relationships between health, social resources, and geographical landscape within and beyond the household. GIS and microanalysis reveal the unexpected relationships involved in healthcare development in this and other developing regions.

Surprisingly, within the household, as we saw above, more people did not necessarily lead to a more active healthcare seeking regime. More people in the household was associated with less intensive first treatments and more intensive second treatments ($p<.05$), the same

pattern identified for the risk-averse Paschimgaon villagers (above). This finding highlights the ways in which healthcare and economic pursuits are brought into competition in agrarian livelihoods, especially in regions where scarce resources demand a strict and highly-coordinated subsistence schedule (24). However, households with higher worker-to-dependent ratios tended to have lower levels of (mainly female) sickness during strenuous agricultural periods, again highlighting the importance of household composition in determining both healthcare seeking and health outcomes.

External to the household, non-kin political connections with people in the district capital correlated with more, and more intensive, third treatments for both villages in the study site ($p<.01$), suggesting that households were drawing on social resources when sicknesses were particularly persistent or other resources had run out. The kin network maps in ArcGIS (Figure 4 above) reveal the ways in which this plays out in Uttargaon's favor. Ethnographic evidence suggests that influential people at the district level helped out family and friends from the villages by providing loans to cover the cost of treatment, room and board for the duration of extra-village treatment, and/or facilitation of the healthcare seeking process at the district hospital using political muscle. In Nepal, informal channels like these, connecting village Nepalis to more powerful patrons, traditionally defined the few pathways of power available to rural people (49). Likewise, higher numbers of neighboring kin were significantly associated with shorter wait periods before the first treatment, simultaneous use of several health treatments, and use of more than one treatment method for a given sickness ($p<.05$). These results confirm ethnographic evidence that neighboring kin were an important resource in the healthcare seeking process. Kin were called upon to help sick people reach their treatment

destinations, to provide money, food, or childcare so a parent could take a sick child to the hospital, or to provide labor if sickness befell during critical agricultural periods.

Conclusions

Although in many ways unique, the landscape of health and healthcare seeking in Humla District as revealed by GIS analysis embodies and amplifies the complex nature of health service delivery in the developing world. Problems with healthcare development are clearly not the result of stupidity or malice on the part of villagers or development organizations, but of the unintended consequences of culture clashes within scarce environments. The findings presented above point to specific issues in health service delivery that are ripe for improvement in remote regions, and the ways in which GIS can improve our understandings of healthcare access in the developing world.

Health programs implemented by the NGOs in Humla District tended to conform to pre-existing hierarchies of social status. The treatment system in Humla demands quantities of both time and cash, so those who were already more inclined to accept development workers, programs and ideologies were also most able, economically, to reap its benefits. The true inequality exacerbated by the healthcare system in Humla, then, had to do with the status of having *bikas* (development) and knowing how to mobilize social resources to benefit from it. Ironically, this development savvy did not lead to better health status. In a reversal, the use of biomedical medicines and treatments conferred status on the users despite worse health outcomes in the short-term. Comparisons between more developed and less developed villages using GIS revealed the landscape's effects on differences in diet, kin networks, and labor that led to such unexpected reversals in healthcare seeking and health vulnerability.

We suggest this trend is part of a more general healthcare seeking transition brought

about by rapid development in regions characterized by scarcity and remoteness. In its first stage, healthcare seeking is locally available and low cost but there is still high mortality. In the interim stage, biomedical health services become available, but they are distant and costly, and only those who are heavily involved in the cash economy can take advantage of them. In this transition, though, the services themselves are unreliable and the costs of earning an income exact a great toll on user groups, and morbidity actually trends upward. Also, large families are essential to accomplishing household goals during this healthcare seeking transition, because economic opportunities and newly available health services are still so far away and highly volatile, demanding that households cast a wide net in the search for both cash and health services. They are willing to do so out of as much an imaginary development reality as an actual one (cf. 50). Presumably, in a third stage, improvements in the healthcare infrastructure, locally available education, and quality of services would combine with a more integrated cash economy, and health outcomes would improve at least for those who could afford the cost of services. This stage still does not privilege equitable healthcare access for all (see 48), and it hinges on the success of other forms of neoliberal development, such as the wholesale integration of the cash economy and the success of local business endeavors, by no means a foregone conclusion in places like Humla, nor an unmitigated good.

GIS analysis of the variation among villages and individuals in a single community also points to ways in which proponents of development can improve upon the success of their programs in order to build a more accessible healthcare landscape in Humla District and beyond. In 2009 and 2010 research, we observed the extent of successful adoption of NGO-implemented latrines that did appear to be negatively related to the prevalence of GI sickness in the fieldsite (Figure 8). This, combined with high rates of gastrointestinal sickness in the fieldsite, indicates

that development organizations have a potential role to play in healthcare improvements, if carried out wisely.

However, the vulnerabilities accompanying a healthcare seeking transition in remote regions of rapid development, demonstrated in this analysis, highlight particular policy areas requiring attention. A neoliberal focus on curative medicine obscures the key roles nutrition and social supports play in *preventing* sickness. These areas of sickness prevention need to be incorporated in healthcare and other development programs to accommodate the transition to a cash economy. Next, while health infrastructure projects struggle to keep apace of the "global imaginary" (50) sought by local people, mobile health services that incorporate pluralistic health beliefs would go a long way to making health services more accessible. The range of differences between the two villages of the fieldsite further demonstrates two other problems confronting healthcare development: first, the tendency of development projects to increase inequalities even in relatively homogeneous populations; and second, the range of vulnerabilities accompanying even micro-climatological differences, especially in mountainous environments. A one-size-fits-all approach to health care development will exacerbate inequalities and deepen vulnerabilities specific to varied eco-political contexts.

GIS research can illuminate the pathways to successful healthcare development by connecting social network information to the landscape properties that facilitate or form barriers to human health. Those who have studied the diffusion of innovations in South Asia note the continued importance of geography and information sources to adoption of new innovations (51-56). Geography, especially in conflict settings, may impact access to innovations physically and socially through people's relationships and experiences (57). Therefore, decisions to participate in conflicts and engage with development are parts of broader social patterns, embedded in remote

landscape features, and influenced in multiple ways by the geographic and social characteristics of networks in which people are immersed. Identifying those features that affect development success is key to the design of health development programs, and one *forte* of GIS analysis.

Acknowledgments

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Figures

Figure 1. Remote Humla District, Nepal

Figure 2. The villages in the fieldsite have distinct geographical features.

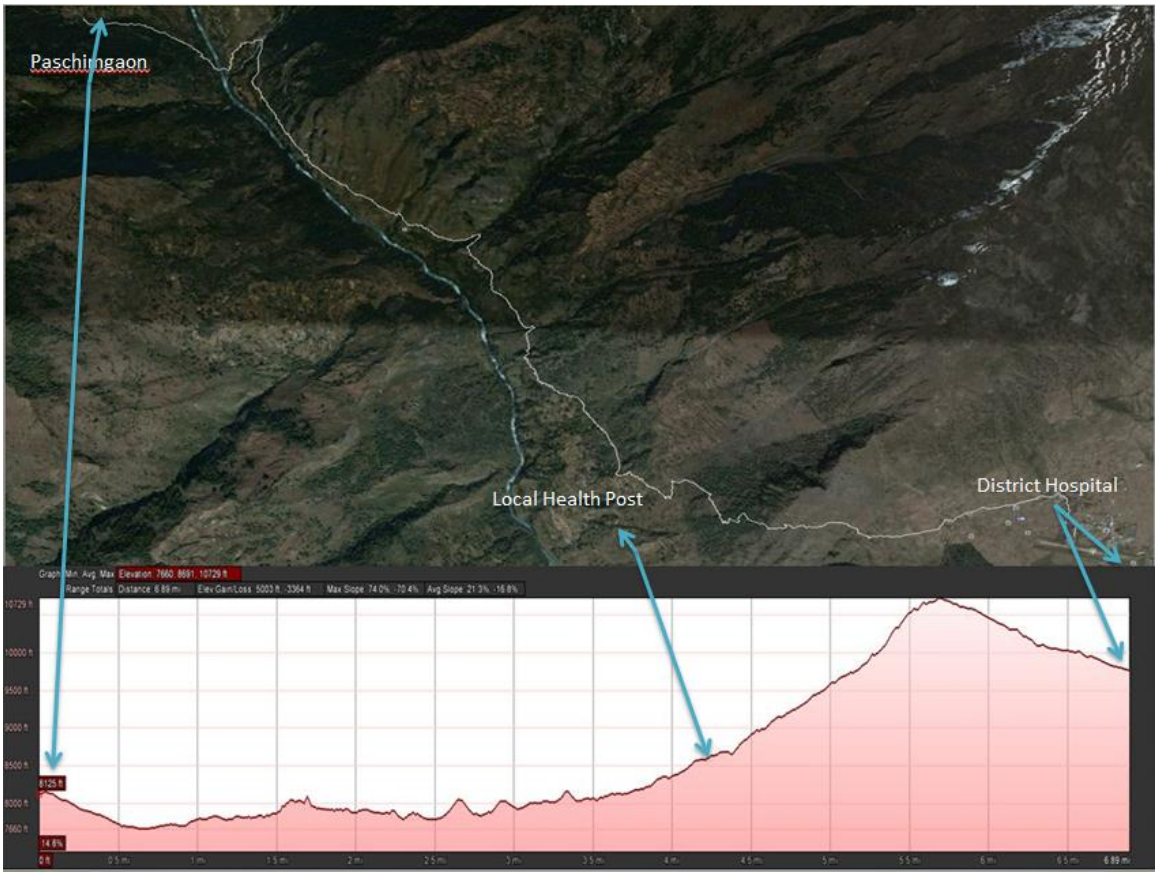

Figure 3. Digital Globe imagery illustrates the difficult walking path to treatment services in the district capital\

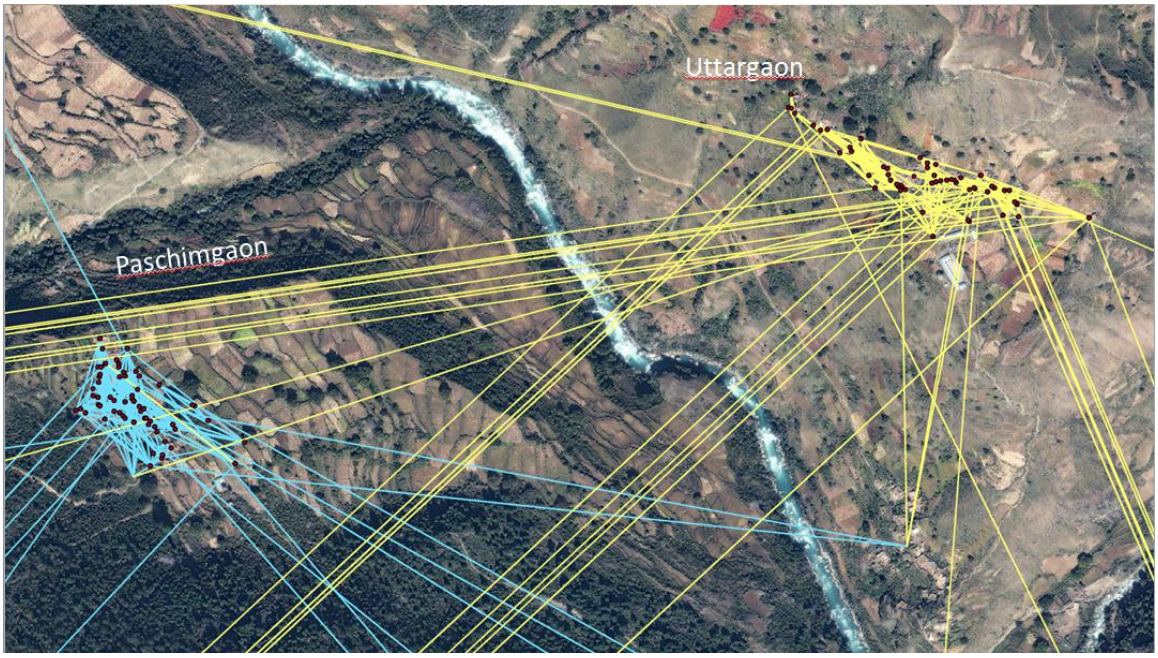

Figure 4. This map linking households sharing 'blood' and marital kin connections reveals the denser introverted nature of Paschimgaon's networks, compared to Uttargaon's longer-distance, sparser networks

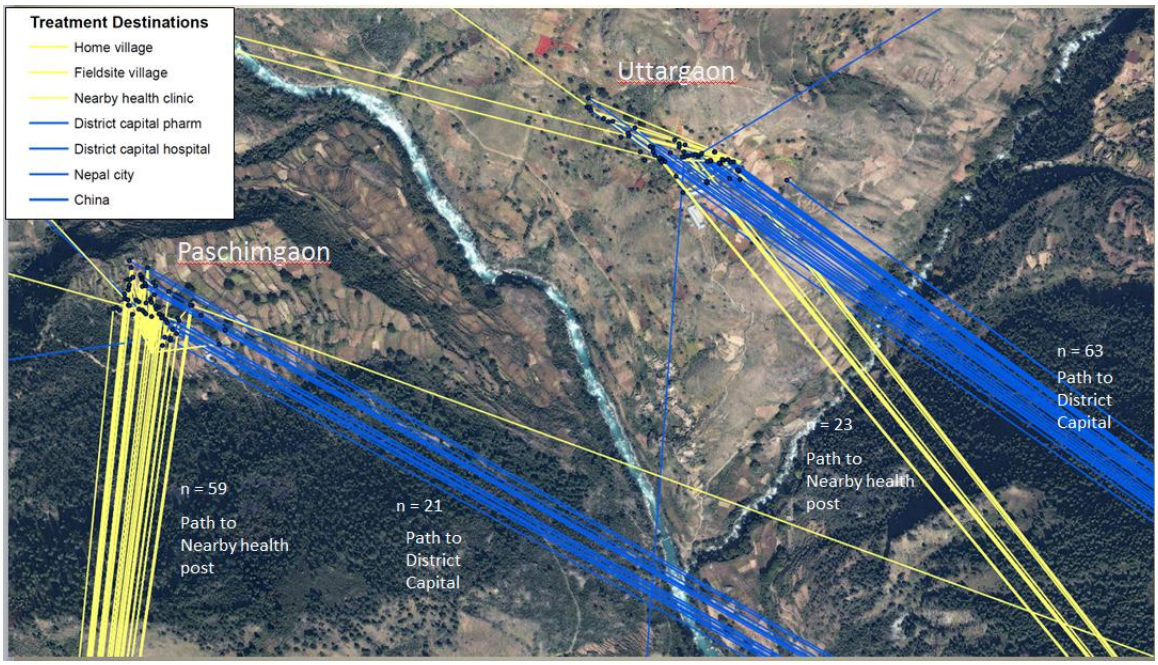

Figure 5. First method of treatment for sickness in the fieldsite.

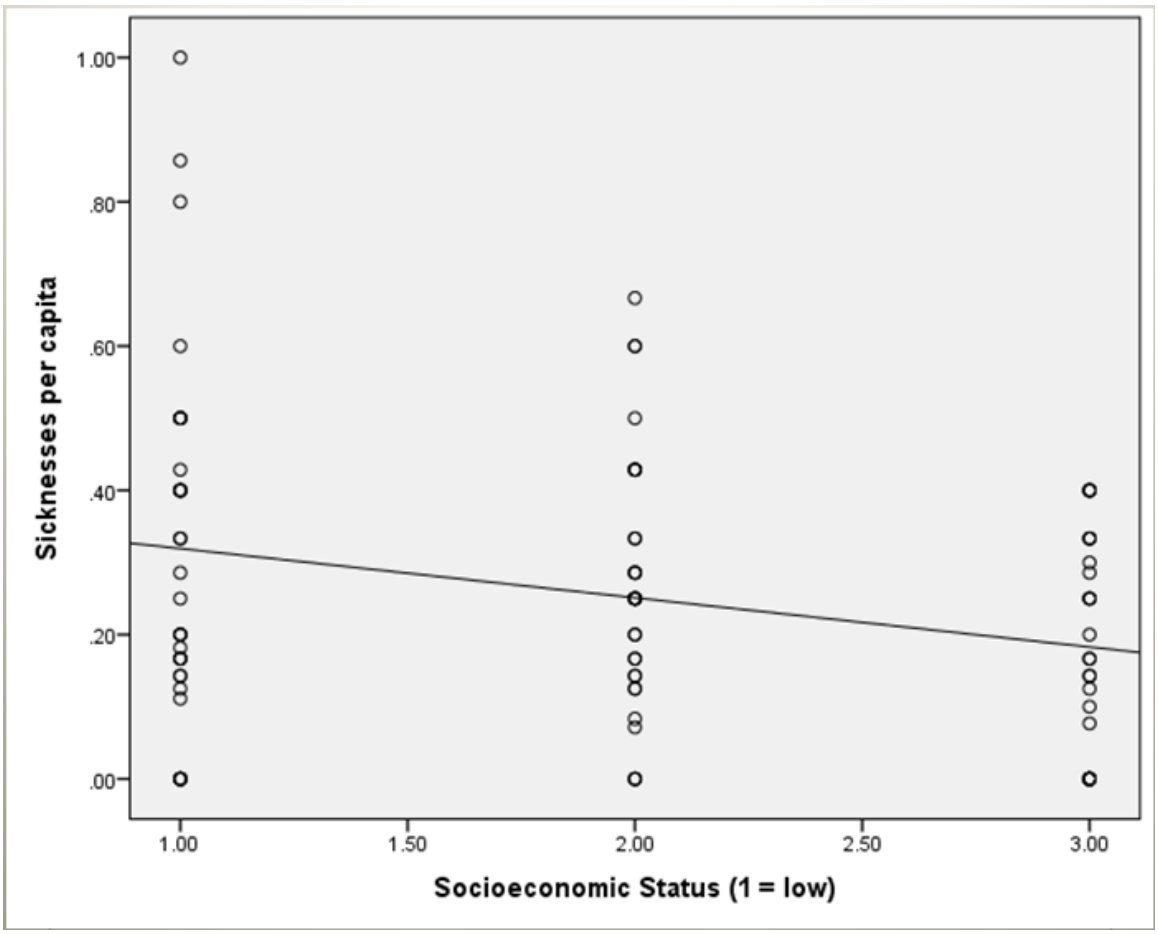

Figure 6. In general, as socioeconomic status increased, sickness decreased

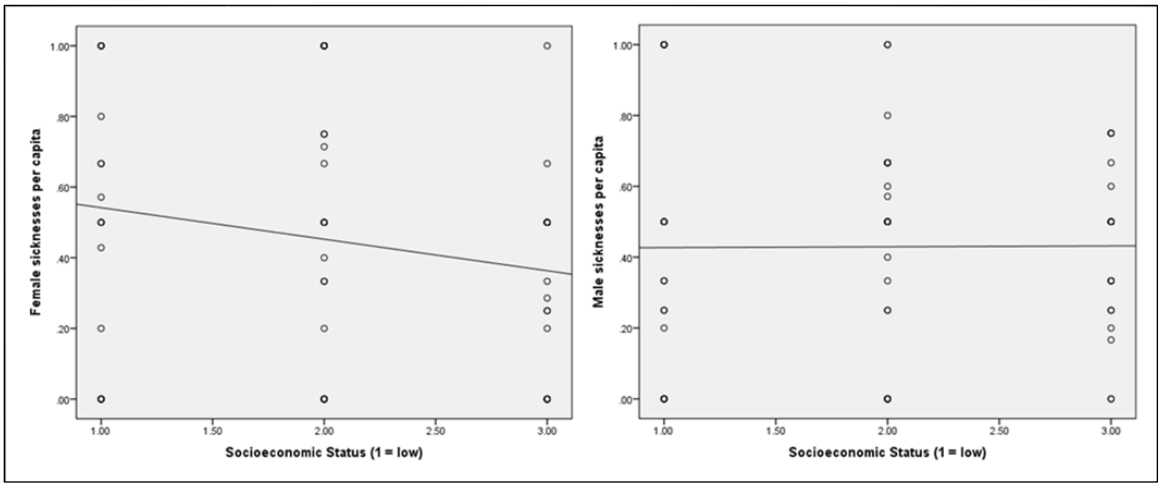

Figure 7. Male health was less affected by socioeconomic status than female health

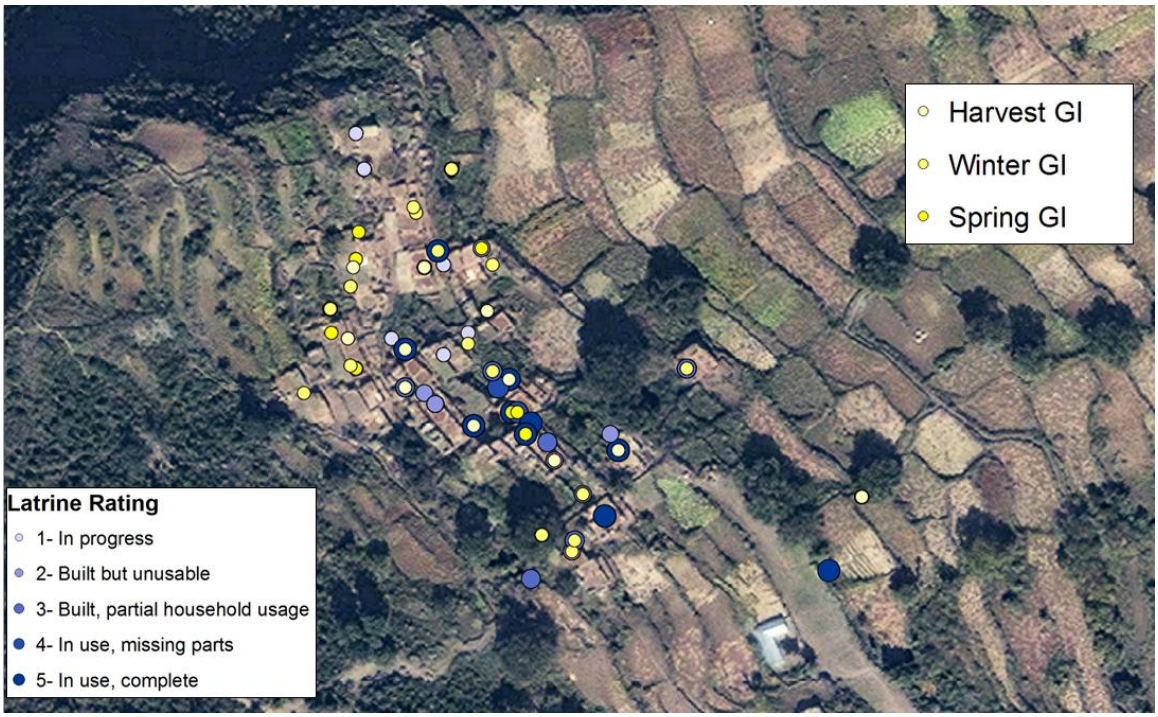

Figure 8. Prevalence of GI sickness rose in areas likely to be affected by sewage problems due to lack of toileting systems

Tables

	All Sickness		Treated Sickness	
	Frequency (occurrences)	% of all sickness	Frequency (occurrences)	% of all treatments
Gastrointestinal	149	23.7	105	40.9
Fever	104	16.5	55	21.4
Cough	88	14.0	16	6.2
Injury	76	12.1	18	7.0
Minor infection	65	10.3	21	8.2
Flu	36	5.7	12	4.7
Other	79	12.7	17	6.7
Total	629	100	257	100

Table 1.

	1st Treatment: All Sicknesses		1st Treatment: GI	
	Frequency	Percent	Frequency	Percent
Pharmacy- nearby	81	31.5	34	32.4
Pharmacy-Simikot	61	23.7	30	28.6
Herbs	48	18.7	26	24.8
Simikot medical treatment	24	9.3	6	5.7
None	23	8.9	3	2.9
Dhami	17	6.6	5	4.8
Treatment in distant urban center	2	.8	1	1.0
Other	1	.4	0	0
Total	257	100.0	105	100.0

Table 2.

	Village	N (households)	Mean
Months of food security	Paschimgaon	67	2.9851
this year**	Uttargaon	61	1.4781
People suffering	Paschimgaon	63	.3810
gastrointestinal problems*	Uttargaon	58	.6552
People suffering	Paschimgaon	53	.1132
respiratory problems**	Uttargaon	48	.5833

Table 3. Statistically significant village differences in well-being.
**= significant at p<.01; *= significant at p<.05

	Village	N (households)	Mean
Total number of	Paschimgaon	67	1.72
technologies adopted **	Uttargaon	61	2.72
Number of health	Paschimgaon	67	1.22
technologies adopted**	Uttargaon	61	1.72
socioeconomic status*	Paschimgaon	67	1.5701
	Uttargaon	62	1.7565
Total income (in Nepali	Paschimgaon	67	16490.07
rupees)*	Uttargaon	61	21987.79
Education per # people in	Paschimgaon	67	1.4731
household **	Uttargaon	61	2.4480

Table 4. Statistically significant village differences in level of 'development'.
**= significant at p<.01; *= significant at p<.05

1st Treatment + Village Crosstabulation**			
	Paschimgaon	Uttargaon	Total
No treatment	16	7	23
Herbs	29	19	48
Dhami (shaman)	11	6	17
Health post- nearby	58	23	81
Pharmacy-District capital	16	45	61
Simikot medical treatment	5	19	24
Other	2	1	3
Total	137	120	257

Table 5. **Pearson Chi Square p=.000

Type of sickness/symptoms + Village Crosstabulation**				
		Paschimgaon	Uttargaon	Total
Type of sickness/symptoms	Chronic pain	12	3	15
	Chronic weakness	7	8	15
	Asthma	4	8	12
	Other chronic condition	7	26	32
	Total	30	45	75

Table 6. **Pearson Chi Square p=.003

Household composition + harvest sickness correlations			
		Sickness	Female sickness
Male-female ratio	Pearson Correlation	-.326**	-.294*
	Sig. (2-tailed)	.005	.012
	N	72	72
Worker-dependent ratio	Pearson Correlation	-.111	-.259*
	Sig. (2-tailed)	.362	.032
	N	70	69

Table 7. **= significant at p<.01; *= significant at p<.05

Harvest season sickness + labor correlations			
		Days off work due to sickness	Days off female work due to sickness
Workers outside the village	Pearson Correlation	.290*	.263*
	Sig. (2-tailed)	.017	.032
	N	67	67

Table 8. **= significant at p<.01; *= significant at p<.05

Field size, labor, and sickness correlations			
		Female work days lost to sickness- harvest	Female work days lost to sickness- early summer
Field size measured in labor days	Pearson Correlation	-.286*	.232*
	Sig. (2-tailed)	.016	.019
	N	70	101

Table 9. **= significant at p<.01; *= significant at p<.05

Spearman's rho correlations: Income (Nepali rupees) + treatment

		Cash earned during previous year	Equivalent of previous year's in-kind income	Equivalent of total income 2009-2010
Cost-intensiveness of 1st method of treatment	Correlation Coefficient	.255*	.286**	.233*
	Sig. (2-tailed)	.019	.008	.032
	N	84	84	85

Table 10. **= significant at p<.01; *= significant at p<.05

		Average distance to fields	**Average distance to best quality fields**
Period of time before first treatment (days)	Pearson Correlation	.397**	.502**
	Sig. (2-tailed)	.004	.001
	N	50	38

Table 11. **= significant at p<.01

The People behind the 'People's War': Decision making about conflict in a remote region of Nepal

Abstract: "People's wars" are widely supposed to appeal to poorer or more vulnerable members of a population. In Nepal, an armed conflict dominated the political landscape for nearly ten years, ostensibly to uplift downtrodden members of society. This paper is based on field research in two Hindu villages in northwest Nepal during 2009 and 2010. The data we will present challenges conventional wisdom about how 'people's wars' motivate individuals of different social positions based on research within this caste-based community. Although the entire region is characterized by poverty and vulnerability to human-made and natural risks, the people who joined the cause of the Maoists during the insurgency could produce more food in a year, had higher average incomes, and higher overall socioeconomic statuses than those who did not join. Some of the motivations and conditions associated with joining ranks with the Maoists are discussed in this paper. We explore the social and material resource conditions conducive to engagement in risky insurgent behavior in a politically and ecologically diverse and fragile context, and consider the ramifications for Nepal's ongoing development and struggle over political control amidst fractured ethnic politics.

Key terms: Nepal, conflict, vulnerability, decision making, risk, mountains

Introduction: Structure-Agency Debates in Rural Conflict

A people's war entails guerilla warfare against the state, a method by which rural subjects often have the advantage of local knowledge in - to the opponents- an unfamiliar and difficult terrain inhabited by "peasant soldiers" of uncertain allegiance (Wolf 1969). Ideology about equal distribution of resources and rights to self-determination fuels rebellion by appealing to those members of society a) long-neglected by state representation and b) conveniently positioned for guerrilla warfare: the rural poor (Tse-Tung 1961). While successful revolutions must also appeal to the urban disenfranchised, the guerrilla warfare phase of a 'people's war' is more dependent on the participation of rural villagers whether in the campaign itself or in feeding and sheltering the rebel recruits, standing watch, spreading propaganda and/or other supportive services (Scott 1985; Wolf 1969). Because of their pivotal role in the campaign, rebel leadership must concede to rural demands and provide villagers a core role in the rebellion's formative ideology. This ideological and material negotiation between movement leadership and the vulnerable rural

people it purports to represent may vary widely and is poorly understood by social scientists (Gellner 2007; Leve 2007; Tilly 1999; Wolf 1969).

Scholars have been tempted to assume, for instance, that participation in a people's war is an expression of deep-seated disillusion with the *status quo*, and symbolizes individuals' desires to revolutionize their own circumstances. This is what political scientists refer to as the "grievance theory" of conflict risk that predicts rural villagers will rebel when to do so constitutes the only alternative to a system that does not meet their needs (cf. Ballentine and Sherman 2003). Indeed, the Nepal conflict (1996-2006) is well-explained by grievance theory: rural regions with more inequality (a common prerequisite to grievances) were highly correlated with the intensity and onset of conflict (Do and Iyer 2010; Hatlebaak 2009; Nepal et al 2011; Rustad et al 2011). But, at the individual level, people make decisions to engage in rebellion from a much more complex set of circumstances, rather than "agrarian revolt [involving] substantial numbers of peasants acting simultaneously out of anger…" (Scott 1976: 193). Country-level statistical analyses can reveal important patterns of conflict engagement, but not the political and material negotiations propelling it.

When, in 2001, the government exacerbated the fighting by instituting a paramilitary counter-insurgency campaign (Bray et al 2003; Do and Iyer 2010; Kreuttner 2009), the conflict spread throughout Nepal into regions it had not previously affected, including the notoriously remote and mountainous Humla District. Field research conducted among three villages in Humla District, Nepal in 2009 and 2010 explored risk taking and coping behaviors and revealed a pattern of participation in conflict that contradicted country-level statistics: richer Humlis were more likely to participate in the conflict than poorer villagers. We argue that villagers were neither vigilantes of communist principles nor the reluctant conscripts the popular media

portrayed, but that they employed considerable agency with respect to the decision to participate in the conflict, to resist, or to otherwise negotiate conscription. Our analyses explore the possible explanations for differences between micro-level and macro-level data sets.

Swords and Plowshares in the Himalayas

Humla district, located in the far northwestern corner of Nepal between 1500 and 7500 meters elevation, is the second-to-least developed of Nepal's districts (ACF 2006), a situation determined by its high Himalayan location and distance from urban centers. The region is accessible via footpaths and the unpredictable flight schedules observed by some of the Nepalese airlines, which bring planes to the landing strip in the district headquarters, Simikot (Levine 1988, McKay 2002). The high-elevation environs of Humla are also characterized by mountain microclimate heterogeneity and large fluctuations in mean temperatures according to season (Bishop 1990).

In many high areas of the world, increasing population pressure and global influences, complicated by harsh environments, have resulted in deforestation, general lack of sources of clean water, and hunger (Leatherman 1996; Levine 1988; McKay 2002). As a result, food security and well-being become increasingly difficult for the residents to attain. For these Humli agro-pastoralists, a tripartite subsistence schedule traditionally exacted huge demands on the human, material, and social resources residents of Humla cultivated in order to maintain adequate livelihoods (Furer-Haimendorf 1975). In the last generation or so, however, other opportunities have arisen in conjunction with Nepal's neoliberalism process that opened the doors to international trade and aid in the early 1990s.

The current trade route is complex and time-consuming, but trade serves to mitigate stress by introducing a variety of food staples, textiles and resale obtainable in return for goods,

cash, and/or credit. In poor agricultural years, trade can also mitigate the food insecurity households would otherwise experience. However, as international trade routes, they are also subject to political fluctuations, e.g. when the Tibetan border was periodically closed after Tibet's incorporation into the People's Republic of China in 1959, or in 1989, when India closed all but two of the trade border towns to Nepali tradesmen (Khadka 1997, 2000; Levine 1988). Due to political-economic fluctuations (for example, China closed the Humla/Tibet border during the 2008 Olympics), traditional trade terms are increasingly tenuous, with steadily decreasing profit (Garver 1991; Khadka 1997, 2000; Levine 1988).

Tourism and non-governmental organizations, other by-products of the neoliberal era in Nepal, constitute attempts to mitigate some sources of stress, inequality and vulnerability. Tourism supposedly results in an influx of cash for Humlis, although the benefits are unevenly distributed and tend to gravitate to Kathmandu. NGOs offer various health- or resource-oriented programs for the betterment of Humli lives, but for the most part, the NGOs in Humla have had little success due to their institutional instability, lack of coordination, contradictory donor demands, inattention to local needs, and tendency to be corrupted by culturally unacceptable pay-scales and local politics (Citrin 2010; McKay 2002; Sanders 2010).

By 1996, only five years after its induction, the newly organized parliamentary monarchy in Nepal was failing. The government had opened the doors to development, but the vast majority of Nepalis had not begun to enjoy the promised rewards. The influx of foreign aid and foreign agendas destabilized Nepal’s already weak socioeconomic and political status (Singh et al 2005). Under the leadership of Comrade Prachanda, the Maoist party splintered off from the Marxist Leninist Party due to the latter’s reluctance to take a more extreme position against capitalism and corruption. Fueled and informed by Maoist uprisings in China, Peru, and (most

influentially) India, Nepal's Maoists took a hardline stance against the government and began guerilla warfare in the hills of the Mid-Western Development Region of Nepal, the region of the country including Humla District. Maoists chose to begin their revolution there because a history of governmental exploitation and neglect of the region had stoked resentment and fueled the burgeoning current of discontent (Gellner 2007: 12, 21; Onesto 1999).

Between 2001 and 2006, villagers in Humla District answered the demands of Maoists for food, shelter and service, sometimes under threat and at the expense of their own well-being. Some people were then punished by the Royal Nepalese Army (RNA) for aiding and abetting the Maoists. The language surrounding Maoist recruitment for campaigns and services was unequivocal: A "One house, one comrade" mantra warned that one person from each household would be compelled to join the Maoist cause in some fashion (Citrin 2010: 43). But on the ground, the Maoist leadership made concessions to some villagers, especially if the allocation of an able body to the Maoist cause would make subsistence untenable for a given household.

Though Maoist leaders expressed and acted upon their own preferences for young, strong, well-educated men, their willingness to accommodate certain villagers' needs and excuse them from the campaign accentuates the bargaining power that some individuals and households brought to bear on their decisions about the conflict. When the Maoists chose to excuse a household from the "one house, one comrade" mandate, members of the household reported that they often did so for economic reasons. Some villagers resisted participation either by hiding in the forest to avoid conscription, or by negotiating with the Maoists to abbreviate, delay, or revoke their conscription terms.

Many of the services NGOs did succeed in providing were brought to a temporary standstill during the conflict, due to Maoist threats and attacks, and villagers' inability to move

freely about the district (Citrin 2010; Pickering and McKay 2007; McKay 2003). Their revival since the beginning of the peace process (2007) constitutes a challenge to Maoist control of the region, one that is being answered in the form of ongoing political dissent within the Hindu villages of upper Humla.

'Small Wars', Great Uncertainty

For the Humlis with whom we spoke, experiences of the conflict incorporated the traumatic as well as the mundane, in ambiguity characteristic of modern warfare. Modern conflicts are increasingly sub-state conflicts, i.e. they take place within national boundaries rather than across them, and tend to involve guerrilla tactics (Mack et al 2011; Nagengast 1994). This is largely due to increasing social change and instability often thought to be the result of market forces and their impacts on social, trade, and governmental relationships with civil society (Skocpol 1982: 371-3; Wolf 1969:279).

Most theorists agree that rural participation in conflict is a by-product of rural people's (geographically) marginal status compared to their urban counterparts. Geographically marginal regions are often inhabited by socially marginal people (Barth 1969; Pigg 1992; cf. Ferguson and Gupta 1992; Scott 2009). Anthropologists who emphasize rural people's agency argue that engaging in conflict offers oppressed peoples a solution to social exclusion and material scarcity and an opportunity for self-determination (Gellner 2007; Simons 1999; Scott 1976; Starn 1995; Tse-Tung 1961; Wolf 1969). By another logic, rural people simply may not have the resources to expend on deflecting guerrilla incursions. They are thought to be particularly vulnerable to coercion by external agents and passive recipients of conflict (Gellner 2007: 21; Skocpol 1982: 358; Starn 1995). In Humla District, one of the remotest regions of Nepal, structure and agency explanations both contribute to an understanding of conflict participation patterns identified

during research, but neither explains why the Maoist conflict in Humla was one for the relatively rich, counter to national reports citing the worst war outbreaks in poorer regions.

Revealingly, diffusion models more closely resemble the pattern we observed at the household level in Humla District. They tend to portray increasing socioeconomic status associated with *higher* rates of change in a given location (Allub 2001; Henrich and McElreath 2002; Rogers 1995), instead of poorer people at the margins of society accepting 'risks' and innovations. Because adopting innovations requires negotiation of risk, or some degree of uncertainty or potential loss (Roumasset 1979: 5), diffusion explanations can contribute to our understanding of decision making in contexts of war and/or competing ideologies. Typically, wealthier villagers have more resources to expend on investment in new technologies/ideas, whereas their poorer neighbors must direct most of their resources to subsistence tasks (Cancian 1979; Carter 1997: 584; Godoy et al 2000). The same may be said for acceptance of new ideologies like those touted during the Maoist conflict in Nepal. This diffusion model implies that behavior wrought from political theorizing may be the purview of the rich.

Similarly, in the risk literature, higher socioeconomic status households are thought to take on risk because their assets are more expendable. Kuznar (2001) argues that risk taking also intensifies as individuals or households edge toward a socioeconomic cut-off (i.e. households situated at the low end of the "middle class" or the high end of the "lower class" are more likely to take risks; see Figure 1).

Poorer households confront risks only later. However, when they finally do, they tend to adopt strategies perceived as more costly and irreversible, such as selling property in order to meet household needs. These households are often unwilling to invest scarce resources in livelihood alternatives until their circumstances necessitate drastic action (Corbett 1988; Davies

1996). Exploring vulnerability effects, risk researchers have predicted higher risk taking at a locally-defined deprivation cut-off, beneath which resources have been depleted to the extent that desperately poor individuals are compelled to make more potentially costly decisions (Fitzhugh 2001; Hendrickson et al 1996; Leatherman 1996; Lybbert and Barrett 2007; Winterhalder et al 1999). This subsistence threshold model predicts that risk taking occurs at high and extremely low levels of socioeconomic resources, and therefore does not constitute a direct relationship between socioeconomic status and risk taking (Figure 1). In Humla, participation in the Maoist conflict followed the diffusion model for certain resource indices, but the subsistence threshold model for others.

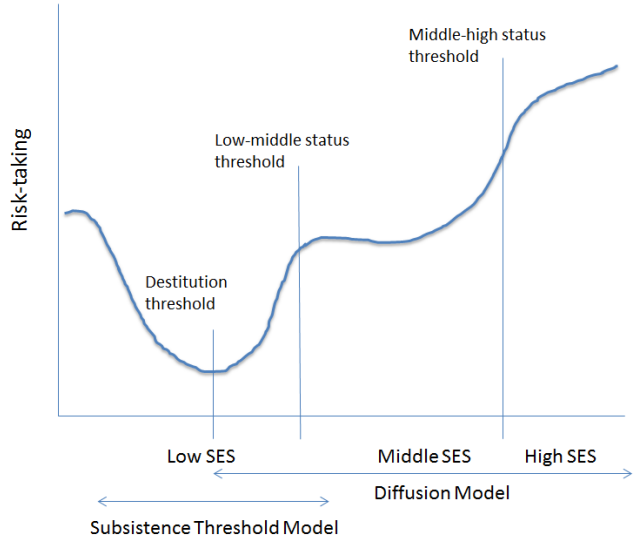

Figure 1. Combined risk taking and diffusion models.

Therefore, reliance on socioeconomic status (SES) to explain risk taking in the risk literature calls into question the diverse ways of measuring SES across human populations, and in the case of this research may obscure the variables that have more to do with decisions to support or resist instigators of conflict. Humli villagers measured socioeconomic status in

multiple ways, and local people seemed to make decisions about the risks in their lives based on varying subsets of these.

For some villagers' decisions, measures of wealth associated with prestige and education mattered more than material resources like land. For others, the desire to earn cash and to establish and maintain business or other connections outside of the village prompted certain types of risky decisions. For many, wealth was measured by the people in their lives: laborers, friends, kin, and business people who alleviated the stresses of a hard life in the mountains of Nepal. In this research, analysis showed that many of the locally used indicators of SES correlated strongly and separately with participation in the conflict. Because local measurements are not conventionally considered in the literature, our research highlights the oft-masked importance of specific material and social resources that are in fact the lynchpins of risk-related decision making.

The presence of choice is a final prerequisite to any study of decision making. Our conversations with villagers hinted at the complex circumstances- beyond socioeconomic status- conscribing choice about the conflict and ongoing politics in Humla. The Maoists themselves were at times strangers and acquaintances, receptive to and dismissive of, villagers' concerns about contributing to their cause. Here we examine the ways in which different understandings of vulnerability functioned in people's decisions about the conscription process.

Measuring Socioeconomic Status

The two Humli villages surveyed in 2009-10 research were composed of 127 Hindu households whose primary subsistence depended on agricultural yields. 298 interviews with male and female household heads focused on aspects of technology adoption (including of stoves, electricity, latrines, greenhouses, water projects, and cell phones) that comprised the bulk of the

first author's dissertation project. Data collection included information on the Maoist conflict to ascertain the gender, age, decision making process, and form and duration of service of conflict participants from each household. Participant observation, focus groups, and interviews with key informants during 15 months of fieldwork helped to contextualize and inform the patterns described by survey responses.

Socioeconomic status (SES) is a multidimensional variable meant to encompass levels of both, prestige and wealth that influence health attainment and social roles, and may vary from culture to culture (Bernard 2006: 37; Ensminger and Fothergill 2003). In public health, sociology and psychology research in the US, it is usually measured in terms of income, occupation and education level (cf. Hollingshead 1975), but these categories have less pertinence for villagers of Humla District, Nepal. SES is likely to be complex in most societies, but is often treated as an objective and self-evident indicator in the literature (Bernard 2006: 239; Ensminger and Fothergill 2003). Comparing responses to two dimensions of change in the villages revealed that different components of SES may make variable contributions to decision processes, depending on the phenomena in question (cf. Smith and Graham 1995).

Following the DFID (2000) designation of five capitals (human, physical, financial, social and natural), our research attempts to analyze villagers' assessment of risk within the framework of the chief types of social and physical/financial capital that are relevant in this region. The framework DFID uses is taken from the rural livelihoods literature (cf. Chambers and Conway1992), and is designed to identify the diverse vulnerabilities that may accompany rapid change (especially in development-intensive settings). "Human capital" has been measured in other studies by collecting data on labor assets available to a household, "social capital" by assessing a household's integration with social networks providing claims to exchangeable

benefits including political power, "physical capital" by collecting data on the non-cash inputs and outputs required for production, "natural capital" by evaluating the resilience and sustainability of the environment from which a household draws its resources, and "financial capital" by measuring a household's cash income against its debts and expenses (see Bebbington 1999; Yaro 2004).

For Humli agropastoralists increasingly incorporated into a market economy, each of these domains variably makes contributions to socioeconomic status. Cash, barter, forest, farm, and family resources affect decisions about day-to-day living as well as about less mundane things like adopting a new cooking/heating method being promoted by a development agency, or the decision to join the insurgency. In terms of conflict, our data showed that social and material resources had the highest associations with decisions to engage with Maoist agents of change, and provided insights into the relationships among resources, conflict, and development for post-conflict, rural Nepal.

The Humli Maoists

Of the 127-household sample, 97 individuals from 92 households reported sending someone with the Maoists, and 35 households had no participants in the conflict. The mean age was 31 for conscripted individuals. 52 participants (53%) went with the Maoists for periods of less than a month or were only occasionally called on to porter materials. The rest (47%) joined the Maoist cadres for periods one month long or longer, some up to 6 years of service. Our data reveal that participation in the conflict was directly and significantly correlated with indicators of socioeconomic status including amount of land under cultivation, educational attainment, household composition (including size and dependency ratio) and history of technology adoption. Attitudes about joining the campaign tended to be negative, since the Maoists

demanded scarce resources of participants and their families, and due to villagers' basic unfamiliarity with national-level politics and ideologies.

Risk Models

When comparing non-participating households to households in which one or more members participated in the conflict, clear and statistically significant patterns emerge. Members of non-participant households perceived themselves as poorer than their neighbors, had lower education levels, fewer labor and food resources and had adopted fewer of the new development-related technologies (stoves, lights, latrines, greenhouses, timber saws, and cell phones) than participant households (Table 1). In general, increasing socioeconomic status meant increased participation in the conflict. These results, using socioeconomic status in aggregate form, show a clear resonance with diffusion and risk models predicting that lower socioeconomic status individuals are more likely to be risk-averse and will strategize to avoid situations that increase their vulnerability (Figure 1 above).

	Conflict participation	**N**	**Mean**
Self-reported socioeconomic status**	Non-participant	36	1.25
	Participant	92	1.51
People in household	Non-participant	36	5.51
	Participant	92	6.68
Education level*	Non-participant	36	9.1944
	Participant	92	14.0750
Wife is educated more than husband*	Non-participant	36	.00
	Participant	92	.10
Months of food security this year**	Non-participant	36	1.6250
	Participant	92	2.5181
Months of food security last year**	Non-participant	36	2.3542
	Participant	91	3.8525
Number of technologies	Non-participant	36	1.53

adopted**	Participant	92	2.46

Table 2. Non-participant household exhibited greater socioeconomic vulnerability than participant households. **= significant at p<.01; *= significant at p<.05

Indeed, disaggregated analyses of only social resources mirrored this direct relationship between SES and risk taking (Figure 2). However, Humli decisions about conflict based on a subset of their assets also reflected aspects of a subsistence threshold model. In general, participation in conflict increased with socioeconomic status, but there was a clear desperation-factor propelling conflict participation at the lowest ranges of material wealth (Figure 3). As described above, threshold models accounts for the ways in which extreme poverty predicts desperate risk taking even while wealthier members of society continue proactively taking on risk (cf. Corbett 1988; Davies 1996; Leatherman 1996). Thus, households with extremely little food and income came to resemble high status households in terms of conflict participation. For food resources, low-status conflict participation occurred below two months food security. Likewise, households that neared an income of zero Nepali rupees (NRs) per season were as likely to have contributed a member to the Maoist cause as households whose income exceeded 20,000 NRs for the same period, with a clear threshold at a seasonal income of 5,000 NRs.

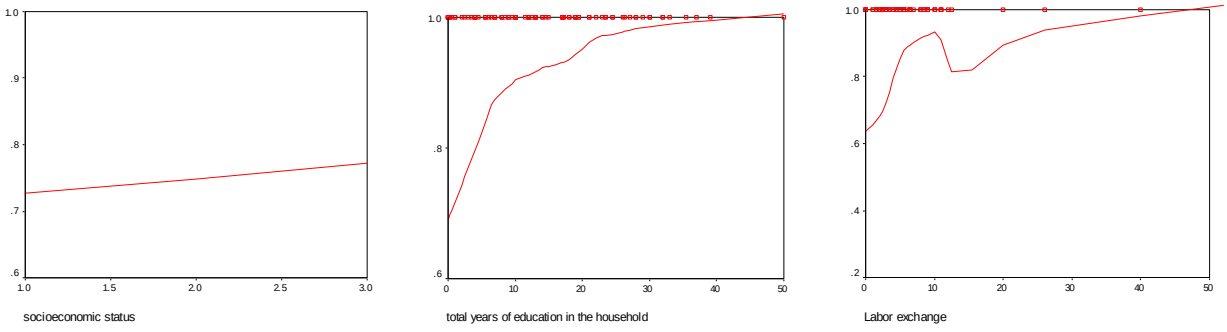

Figure 2. As social status indicators increase, so does participation in conflict.

In the subsistence-threshold model, presumably, richer households that adopt risks do so for different reasons than households making risky decisions from a resource-scarce position.

Indeed, the richer Humlis' narratives of the conscription process described high levels of choice and negotiation with the Maoists and fairly relaxed duties in the campaigns, with the exception of one ward in the most conflict-affected village in the fieldsite (featured below). The more lucrative households in this ward were unable to achieve any negotiation power and experienced their members' forcible conscription. One village leader from the ward recalled that the Maoists punished his family for his role in village governance. Another father said his son ran away from the Maoists several times during his three-year term, but each time the Maoists re-conscripted him. Below, we provide ethnographic background that explains this ward's disproportionately disruptive experiences of the conflict, compared to the less-afflicted experiences of other resource-affluent households.

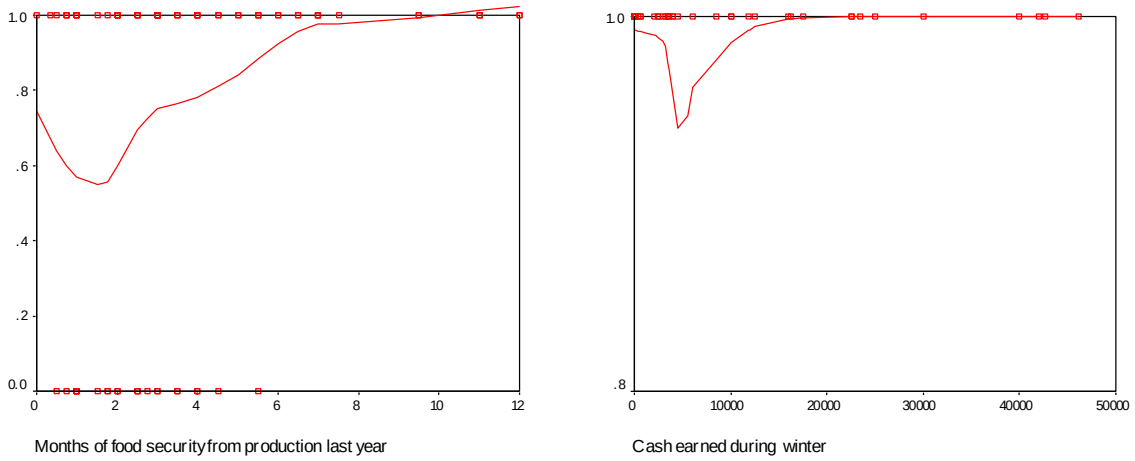

Figure 3. The relationship between conflict participation and physical/financial assets revealed a threshold effect.

For Humla District, then, these models predict that the most volatile circumstances (situations in which people were more willing to take risks, such as to abandon farming to join the armed insurrection) exist where there are low levels of material resources but high levels of social resources. Social and material resources tend to have a direct relationship to one another

(Ostrom and Ahn 2001), but ethnographic evidence revealed that, for the study area, community development activities may have been responsible for creating precisely this situation of social-material imbalance in one of the villages prior to the conflict.

Connections and Divisions in Humli Politics

The Maoists exerted viable political control over a large part of Nepal for the last fifteen years. They appealed to villagers across ethnic and caste lines as the insurgency spread from west to east across Nepal, unifying people of a variety of ethnic and caste identities and subsistence systems (Schneiderman and Turin 2004). Young men and women with access to education had become disenfranchised from the opportunities presented to them in Bollywood and Hollywood depictions of capitalist lifestyles (cf. Norberg-Hodge 1991). An estimated one-third of Nepalis were willing to risk their tenuous place in the capitalist regime by rejecting a wage and taking up arms against the government, testimony to how unsuccessfully "democratic" the parliamentary monarchy had proved to be (Bray et al 2003, Hutt 2004). Critically, the Maoist insurgency gained its first and broadest range of support from the very areas in the western hills of Nepal where USAID had instituted its largest integrated rural development programs in the 1980s (Khadka 2000; Shrestha and Bhattarai 2003). The failure of such programs to accomplish both their most explicit objective (the eradication of poverty) and implicit agenda (to promote democracy), is only part of the story. The extremely high expectations accompanying democracy, the emphasis by developers on education, exposure to global media, and the pressure to relinquish social roles, led to both support and resistance of the Maoist program in Nepal, according to Leve (2007; cf. Singh et al 2007). In Leve's view, whether people identified with the Maoist propaganda or not, discontented Nepalis yearned for the same thing by 1996: new

social roles to replace what had been taken from them in the transition to parliamentary monarchy in 1991.

Not just the failures, but the successes of development were also fueling Nepalis' decisions to engage with the Maoists (Leve 2007). For Humla District, this was certainly true. The expansion of the cash economy promoted the development of new trade networks; education gave rural students access to teachers from urban centers as well as regular contact with youth from neighboring villages; new communication technologies allowed for national politics to infiltrate a countryside hitherto largely ignorant of and ignored by their national government (see Fisher 1987; Leve 2007; cf. Scott 1976; Wolf 1969). These successes of development led to rapid social change and exchange of novel information in Humla District, thus providing both the equipment to manage and the desire to express Maoist messages when they arrived in 2001.

While development, in general, allowed rural people to capitalize on new and expanding social relationships and symbols of social status, meeting basic subsistence needs remained just as difficult, if not more so, for rural householders (Ashley and Maxwell 2001; Devkota 1994; Hoy 1998; Leve 2007; Streeten 1997). That is, development may lead to a situation in which social resources increase but physical resources remain low, the kind of situation that, according to the graphs presented in Figures 2 and 3, increased Humlis' vulnerability to conflict.

Ecological and Development-Related Drivers of Risk taking

Although the villages in the study site were located less than three miles from one another (Figure 4), their social, economic, and environmental microclimates influenced decidedly different relationships to risk. Paschimgaon residents till the only rice fields in northern Humla, and their position between two streams insures them geographical autonomy from neighboring villages. During the twelve months of fieldwork, only one observed inter-

village land management dispute involved Paschimgaon, when villagers of Madhyagaon tried grazing their animals on Paschimgaon's side without permission. In contrast, villagers of Madhyagaon and Uttargaon were in daily disputes over grazing rights during the winter when animals returned from the high pastures, partially due to their proximity to one another, scarcity of forest resources, and the lack of physical features separating their territories.

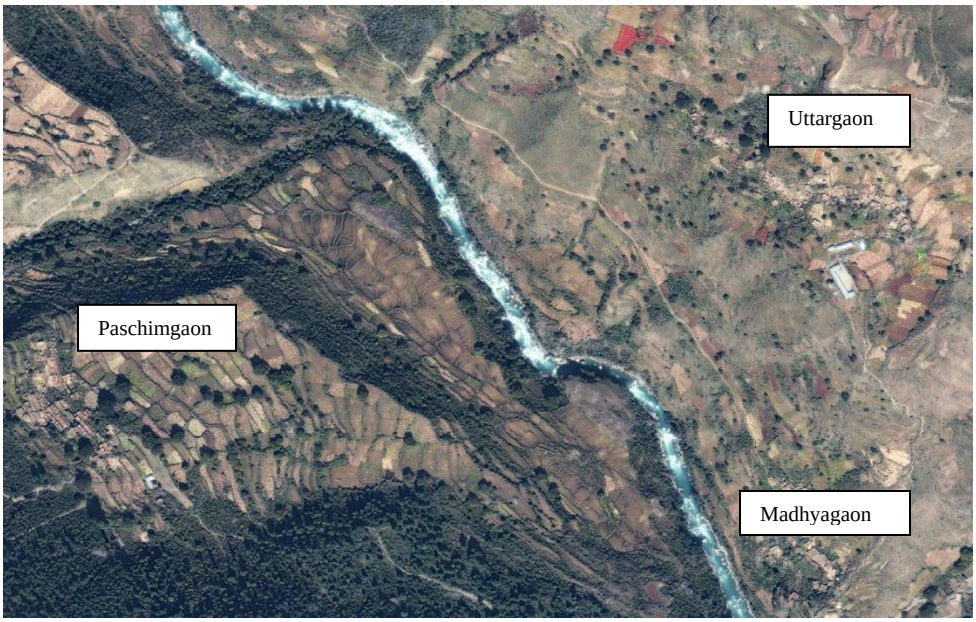

Figure 4. GIS imagery depicting the ecological differences between villages in the fieldsite.

Paschimgaon's relatively fertile production (Figure 5) makes great demands on villagers' human resources, dictating that several male and female members be involved in agricultural activities throughout the year. Worker-dependent ratios and other demographic trends were virtually identical to Uttargaon's, but Paschimgaon villagers experience more demands for agricultural labor throughout the year. As a result, fewer of their children go to school, and those who do take off many days, or even months, in order to perform agricultural and livestock duties.

Figure 5. Paschimgaon (left) has flatter and more fertile fields than Uttargaon (right).

Paschimgaon's much lower levels of engagement with development technologies (Table 2) reflect other unique aspects of their microclimate. Their relative isolation from other villages and lower levels of school attendance exclude them from the social networks Uttargaon depends on for news, attitudes, and important political and business connections. Uttargaon is home to the only secondary school in upper Humla, and as a result, villagers have exposure to a diverse range of extra-village people, ideas, and political connections unavailable to the people of Paschimgaon, who remain fairly deeply-rooted in traditional livelihoods and conservative values. As a result of the effects of population pressure and climate change on the erosion of their steep, un-irrigated fields, people in Uttargaon have been forced over the last generation to engage more fully with the opportunities presented by the growing development presence in Humla. In addition, their higher exposure to external views and ideas has made them more amenable to the technologies themselves, as well as the values espoused by developers, who are usually from urban centers in the developing and developed worlds (cf. Rogers 1995).

These differences account for the variations in the contributions of human, social, physical, and financial capitals to decision making by different villagers (cf. DFID 2000). Paschimgaon villagers experienced significantly fewer gastrointestinal and respiratory illnesses (Table 2) during the seasons when the majority of villagers were at home (as opposed to outside trading or managing livestock). This can be attributed in large part to higher food security and

caloric intake. In turn, better labor returns resulted in a feedback loop bolstering continued agricultural productivity. By contrast, many Uttargaon villagers earned rice or money for their labor outside the village while they were traveling and making social connections. Development initiatives had expanded Uttargaon villagers' social resources but did not improve their physical and financial standing with respect to Paschimgaon (despite serving to diversify Uttargaon's resource base). By contrast, in Paschimgaon, physical capital was relatively high, while external (to the village) social capital remained comparatively low. In accordance with the conflict participation findings related above, then, Uttargaon villagers were more vulnerable to the conflict and more likely to make risky decisions than people in Paschimgaon, perhaps due to their low levels of physical and high levels of social resources. The behavior predicted by a resource-specific diffusion-threshold model was reflected in the conflict participation patterns of the two villages.

	Village	**N (households)**	**Mean**
Total number of technologies adopted **	Paschimgaon	67	1.72
	Uttargaon	61	2.72
People suffering gastrointestinal problems*	Paschimgaon	63	.3810
	Uttargaon	58	.6552
People suffering respiratory problems**	Paschimgaon	53	.1132
	Uttargaon	48	.5833

Table 3. Technologies included stove, electricity, latrines, greenhouses, timber saws, and cell phones. **= significant at p<.01; *= significant at p<.05.

Village Variations in Conflict Participation

During fieldwork, some Humli villagers explained the difficulties of life in the Maoist campaign, while others indicated politely that the memory of it was full of "*dukha"* (deep sorrow and pain) that they would prefer to leave behind them. In addition to the angst experienced within the villages they left behind, participants in the campaign never had enough to eat and

slept many nights out in the cold, and they were forced to carry heavy burdens, stand duty all night, and/or walk long distances without rest. We analyzed conflict decisions using a) active participation with the Maoist campaign, b) term-length, and c) risky avoidance behaviors as components of risk taking reported by participants and would-be conscripts. While Maoist conscription was sometimes mandatory, many villagers reported being able to negotiate participation in the conflict, duration of participation, and choice of participating individuals within the household. Analysis of Uttargaon villagers' experiences with the conflict reveals that these households were under more pressure to cooperate with the Maoists, and garnered less sympathy from Maoist leadership, than their culturally conservative, 'provincial' neighbors in Paschimgaon.

When a family could negotiate to have their most productive members excused from service, they did all they could to protect their households from the material and emotional losses conscription entailed. Uttargaon's participants in the conflict were better educated and younger than Paschimgaon's, reflecting the Maoist preference for young, well-educated males who are active in household production (they are also the most locally-prized members of Humli households), and demonstrating the relative inability of Uttargaon households to negotiate with Maoist cadres. Uttargaon's participants also exhibited higher levels of avoidance behavior than Paschimgaon's, presumably due to the higher levels of forced conscription they described in conversations about the conflict. That is, a larger subset of Uttargaon villagers risked retribution by running away from their Maoist duties, lying to their commanding officers to abbreviate their conscription terms, or hiding in the woods for periods of time during the recruitment process.

	Village	N (households)	Mean
Education level of conflict participant*	Paschimgaon	54	2.7037
	Uttargaon	37	4.5946
Age of conflict participant*	Paschimgaon	54	28.0556
	Uttargaon	42	22.1429
Conscript risked escape*	Paschimgaon	67	.1343
	Uttargaon	61	.2951

Table 4. Village differences in participant characteristics. *=significant at the p<.05 level

Whereas in interviews and conversations during fieldwork Paschimgaon villagers recalled little petty factionalism surrounding the conscription process, Uttargaon villagers recounted the ways in which long-standing grievances between families were levied to convince Maoist leadership to conscript certain individuals into (often longer and more dangerous) service terms. It appears that this factionalism was driven or at least exacerbated by Uttargaon villagers' engagement with development.

Much of the development literature reveals how the new opportunities created by development efforts may lead to widening of political cleavages, as villagers scramble for a foothold among newly available opportunities (see Agrawal and Gibson 1999; Belsky 1999; Berlin and Berlin 2004; Devereux 2001; Fisher 1997; Hoy 1998). In Uttargaon, the benefits presented by development agents and accepted by villagers had not been distributed evenly and had become platforms for political leverage or subordination. Radios, exposure to NGO workers from urban centers, and the occasional opportunity to watch Hindi-language films reinforced the arising cleavages under the guise of newly ignited (for Humlis) national-level political interest. For instance, one Uttargaon family found itself on the wrong side of village politics when five young, male members of the household were forcibly conscripted. They said villagers were resentful of the family's newfound wealth (they were involved in several businesses) and had

told the Maoists they belonged to a competing political party. In a similar vein, another young Uttargaon man from a family supporting non-Maoist political parties took a very proactive role in the conflict as a way of protesting his father's distribution of household resources.

While Uttargaon villagers' engagement with development opportunities had offered a widening network of social interactions and greater mobility, it also increased their vulnerability to the negative consequences of a more nationally-connected way of life. Development offered political connections that made long distances shorter in some respects, but short distances also seemed longer when it came to village politics. When the conflict intensified in 2001, recently entrenched factionalism combined with Uttargaon villagers' relative affinity for participating in national-level politics, and enhanced their vulnerability to the worst consequences of the conflict.

Enemies and Allies: Communism and 'Imperial' Development

Despite aggregate data reflecting that the conflict gained momentum in the poorest regions of the country, our findings revealed that the Nepal conflict involved mainly higher-level socioeconomic statuses in Humla, in other words, the richest poor. The inhabitants of Humla District are on average among the poorest in all of Nepal (ACF 2006), but there are substantial variations among Humlis. They exhibited varying motivations for and patterns of risk taking that countered predictions based on macro-level data.

During and since the conflict, Humlis have incorporated their experiences with force and deprivation into their understanding of place and personhood. Studies detailing experiences of prolonged war emphasize that people incorporate even the most traumatic processes into their lived experiences using cultural frames of reference (Dumont 1992; Olujic 1998; Pettigrew 2004; Robbins 2004: 55). The similarities in responses to both revolutionaries and development organizations we observed in Humla are not confined to regions of low-intensity conflict like the

research site. Even there, the tremors of war still divide households and cause conflict in the villages, especially where political party affiliations are advertised and publicly debated. Many NGO workers we talked to blamed an elusive new "politics" for the lack of progress in their various initiatives in the region due to the factionalism we described.

Much to our surprise, our prompts to get villagers to talk about either, the revolutionary changes in Humla since the conflict, or, the vast differences in the risks posed by the conflict as opposed to rapid development, were met with ambivalence. Observations lead us to conclude that the villagers of Humla District, for the most part, viewed the Maoist combatants in much the same light as they did, for example, NGO workers in the region during and preceding the conflict. Higher socioeconomic status individuals responded first to development programs *and* Maoists, and adopted both sets of ideologies and technologies with the most alacrity. Maoists and development workers had much in common, despite being on opposite ends of the political spectrum, and despite the use of force by some Maoists. They were outsiders to the district, they were committed to and espoused equally foreign value systems, and, due to their decentralized governance structures, they exerted comparable influence on the politics and governance of a region previously too remote to attract the presence of the centralized Nepalese government, except as an object of extractive industry.

The Maoists and development workers both espoused gender and caste equality, privileged formal education, and de-valued local systems of social organization. These values have made a lasting impression on even the most traditional villages in Humla District. In so doing, they have created new opportunities for diversifying subsistence in an increasingly scarce environment, but have shaken the foundations of the social roles that anchor local people to their support systems, aspirations, and everyday lives (see also Leve 2007). Through these processes,

the increasing levels of social capital associated with greater risk taking create conditions of instability that inspire desperate responses among the poor.

Our study revealed that risk models applied to only certain resources that make up a household's asset base. Further research exploring whether low-physical/ high-social resources generally contribute to enhanced vulnerability to risk would clarify the relationship between resources and SES. One alternative explanation is that the tendency of development to create instability may exist regardless of the resource base. That is, development may create instability in several types of resources, and uncertainty and factionalism may result as part of the process of social change. However, this study indicates that different resources have specific roles to play in peoples' perceptions of and responses to risk. Additionally, comparisons of externally-imposed with internally-generated change will contribute to an understanding of how different forms of capital are called into play under diverse conditions.

Whereas both the diffusion and conflict literatures leave little room for comparisons between conflict and development, the risk literature allows for their unity, and in so doing it also unites multiple social scientific disciplines. Clearly, risk models and disaggregated socioeconomic indicators have something to offer social scientists and developers who seek to understand vulnerability in scarce environments undergoing rapid development and change. For the individuals who must face the risks described here and answer them with the meager resources available to them, this paper describes the patterns associated with heightened vulnerability to the negative effects of conflict, and points to potential risk-mitigating resources that may enhance their resilience in the face of political or economic instability.

Acknowledgments

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Revolutionary Ideas: An Exploration of the Role of Kinship in Decision Making

Abstract

Humla is a northwestern Himalayan district, widely considered the most remote of Nepal's 75 districts. Like other communities dependent on subsistence-based productive activities (see Chagnon 2009: 20), Humlis' social and political networks, until recently, have been primarily kinship-based (see Levine 1987; cf. Howell 2009:154-5; Levine 2008). However, the rise of Nepali democracy and the development industry since the early 1990s has presented new social networking options to Humlis as well as exposing them to new risks and vulnerabilities. This paper investigates how kinship relates to varying levels of exposure to change in two villages of Humla District. A geospatial analysis using ArcGIS software reveals unexpected patterns affecting human behavior in this remote Himalayan district, and offers stimulating visual representation of information that can facilitate the application of anthropological knowledge to issues in community development.

Introduction

During 2009 and 2010, fieldwork in two neighboring villages in Humla District, Nepal, identified variations in villagers' levels of engagements with outsiders, including development organizations and Maoist combatants. The fieldwork period closely followed the signing of the ceasefire at the end of Nepal's 1996-2006 Maoist uprising, and occurred during a period of continued political instability. In the field, we were interested in investigating one village's reputation for being resistant to the insurrection and also "risk averse" about development innovations offered by NGOs, e.g. smokeless stoves, solar lights, greenhouses, and pit latrines. We found that one of the main reasons for this pattern was the relative degree of agricultural success and the density of the kinship network in one village, which appeared to reduce the

motivation, time, and interest in investing in new technologies or ideas that might alter their agricultural schedules. In this paper, we discuss links between development, food security, and kin networks, and the increases in vulnerability to conflict that accompanied these links.

Development programs and opportunities have begun to integrate rural Nepalis into a market economy that privileges short-term business relationships over traditional kin-based ones (cf. Ellison 2009; Heyman 2004; McMichael 2004: 29). The extension of social networks and the diversification of assets that has accompanied development activities in Humla also appeared to put some villagers at greater risk of intra-village conflict during the Maoist conflict in Nepal (1996-2006), according to patterns we revealed using GIS mapping techniques. Villagers assigned domestic or age-old grievances a current political label and pointed the Maoists to them for harsher conscription (and the Maoists, in many cases, responded). The global emphasis on neoliberal development reforms since the early 1990s has been touted as a solution to developing world poverty, but it has also drawn much criticism by scholars and other critics of aid (see Elyachar 2012; Foley 2008; James 2012; Mosse 2011; Richland 2009; Sharma 2008 for some recent critiques). This paper continues the discussion by exploring neoliberal development programs and their impacts in a remote region of the Himalayas. Aspects of development in the education and trade sectors functioned to expand and reduce the density of kin relationships in Humla District, with the end result that villagers more involved in development were those that were more heavily involved with the conflict.

The Maoist conflict in Nepal (1996-2006) affected Humlis mainly between 2001 and 2006. In 2001, the extreme paramilitary measures taken by the Nepal monarchy then in power and the repercussions of US classification of the Maoist combatants as terrorists escalated the conflict throughout Nepal (Bray et al 2003; this is a classification they have not outlived

according to the US State Department, despite the peace process and the Maoists' current control of the government; retrieved July 23rd, 2012 from: http://www.state.gov/r/pa/ei/bgn/5283.htm). In Humla and throughout Nepal, villagers were subject to a conscription process by Maoist combatants, and therefore had ostensibly less power over terms than they did with development organizations. However, patterns of risk taking were remarkably similar in both cases. Women, in particular, exercised agency in the conflict in ways that both challenged and reflected traditional notions of kinship and social obligation.

While socioeconomic status and inequality has often been used to explain people's responses to the conflict in Nepal, our ethnographic and GIS analysis shows that network structures also have a role to play in processes of social change. Our quasi-natural experiment compared two villages that have had more-or-less opposite patterns of responses to development initiatives since the early 1990s. More intense, long-term engagement with neoliberal development projects and their staff in one village fractured local social groups and extended social and kin networks in ways that were visible using ArcGIS v. 10 software. We suggest that those villagers had worse experiences of the conflict as a result of changes in their social networks. We discuss the implications for current and future decision making in the unpredictable economic and political contexts of post-conflict Nepal, and development's role in terms of social networks in light of these findings.

Development, Conflict, and Kin Networks

NGOs and other development agents have been a dominant force of change in Humla District, and purveyors of health and livelihood improvement schemes where the government of Nepal has had little access or inclination. Their numbers have increased rapidly due to Nepal's

democratization in 1991, when there were only three NGOs registered in the district. By 2010, there were 177 (Citrin 2010; NIDS 2005). While the livelihood status of local people remains tenuous, new NGOs design and implement programs to reinvigorate the economy and improve the standard of living for Humlis. Today, NGOs compete with one another for contracts, regions and programs, and Humli peoples' situation remains one of scarcity and unpredictability. One set of reasons cited for the relative lack of success of aid organizations, in general, are the unintended social consequences of their policies and programs (see Hoy 1992). They may change the nature of how innovations are adopted and how individuals relate to each other, thus shifting individuals' "spaces of vulnerability" (Leatherman 2005). We explore spatial aspects of vulnerabilities in the fieldsite using GIS.

Neoliberal development contributes to changes in social networks in several key ways: 1) social upheaval in the form of renegotiated relationships and social roles (Chapman 2004; Ellison 2009; James 2012), 2) increased connectivity with polarizing political parties and ideologies (cf. Sharma 2006), and 3) increasing socioeconomic gaps among villagers with divergent access to development ideas and technologies (cf. Aiyer 2007; Carter 1997: 583; Foley 2008; Pfeiffer & Chapman 2010). These changes extended kin networks in Humla, and affected peoples' abilities to confront and withstand the political turmoil that accompanied the Maoist conflict in Nepal. Through development organizations (including NGOs and private businesses), individuals in remote regions connect to business associates, friends, and formal education opportunities locally and in urban centers; access communications technologies and other media; and generally grow more independent of their traditionally dense, kin-based networks, and more conversant in the languages of national/ international-level politics and ideologies (cf. Guyer 2004; Sahlins 1972). But, not all individuals are able to invest in development programs, so

neoliberal aid programming has also been accused of contributing to widening gaps between rich and poor (cf. Pfeiffer & Chapman 2010). In Humla District, these gaps took on geo-spatial characteristics with social import.

In turn, expanded social networks affect human decision making by providing alternative avenues for the diffusion of goods and information (cf. Bates et al 2007; Granovetter 1973). Many researchers have deemed the communication aspect of social change the most pertinent to the rapid diffusion of innovations (Henrich 2002; Strang and Soule 1998; Tilly 2003). The most-cited barrier to uptake of development innovations in South Asia is structurally-imposed inequalities that define, strengthen, and increase the distances between social groups (Bhattarai 2004; Pelto 2002; Schuler et al 1985; Wymann von Dach 2002). Social networks influence the diffusion of innovations in both directions (i.e. they may encourage or impede adoption). We examined kin network density in ArcGIS to understand more about the ways in which the spatial characteristics of social relations influence vulnerability. The densities of kin networks in the two villages examined here, Paschimgaon and Uttargaon in northwestern Nepal, diverged in ways that appeared to affect villagers' vulnerability to conflict.

In stressful mountain environments where risks are so ubiquitous that most decisions involve choosing the lesser of two evils, geospatial and ethnographic analyses can unearth key factors in decisions to accept or avoid certain risks. Our GIS analysis of responses to change highlights the social resources by which Humlis adopted outsiders' ideas, behaviors, and technologies. These findings about kin network structure, revealed in GIS analysis, place a new tool in the arsenal of development ethnographers and pose challenges to future development programs for the improvement and appropriateness of service delivery in remote areas.

Humli Experiences of Development and Conflict

Our fieldwork took place among the ethnic Thakuris of upper Humla District. The ethnographic and GIS analyses we describe here revealed distinct social and geospatial characteristics associated with the different reactions we observed to agents of socioeconomic and political change. Thakuris make up all but a few households in the fieldsite and constitute a small but distinctive enclave in Western Nepal. They are the second-highest caste in the Nepali caste system. Compared to their Buddhist-observing neighbors in upper Humla, they rely more on agriculture and are higher caste, although they tend to be poorer. Very little ethnographic research has centered on this group of Nepalis (see e.g. Shrestha 1971).

Despite their physical proximity to one another and other demographic and cultural similarities, the two villages in the fieldsite varied in several important ways. Paschimgaon is bounded on three sides by topographical features that protect its land and forest resources from encroachment by other villages. As a result of their relative geographic isolation and agricultural success, Paschimgaon villagers concentrate their activities within the village and form a tightly-knit community perceived by other villagers and by NGO workers as conservative and averse to progress. By contrast, Uttargaon villagers have access to less fertile, steeper, more dispersed, and more contested agricultural fields and livestock grazing areas, and have begun to look outside their village to find alternatives to a predominantly agricultural subsistence (Figure 1). As a result of their relative inability to meet their subsistence needs through agriculture, Uttargaon villagers have been much quicker to adopt development technologies and programs as means to a more secure livelihood and as symbols of modernity (cf. Cahn 2008). We found that Paschimgaon households had significantly lower technology adoption rates, lower perceptions of their socioeconomic status, less income, and less education than Uttargaon households (Table 1),

and yet they ranked significantly higher than Uttargaon on indicators of health/well-being and food security (Table 2).

Prior to recent fieldwork, we were aware that Paschimgaon was particularly slow to accept development programs, and that residents were considered by development workers as "risk averse" at best and "backwards" at worst (cf. Pigg 1992). During fieldwork, we found that Paschimgaon did indeed adopt fewer of the new technologies being introduced by local NGOs, and that they adopted them at a slower pace than Uttargaon. Our fieldwork, interviews, and data on subsistence suggest this difference was due in part to the high quality of agricultural land in Paschimgaon compared to neighboring villages. The food security they enjoyed from their own fields contributed to better observed and reported health outcomes and an overall enhanced sense of well-being. As a result villagers appeared to have less motivation to engage with agencies offering relief or alternatives to agriculture as a main source of livelihood. In this region, the practice of agriculture is also integrally connected to villagers' identity as Hindu-observing Thakuris. For Paschimgaon villagers, the ability to practice agriculture was both a way of life and a key feature of their ethnic identity.

There was another key difference between the two villages. During our fieldwork, we found that Uttargaon had had more divisive and traumatic experiences with the conflict in general. This was partially a result of the Maoists' activities being more intense there where, just like the NGO employees had, the Maoists perceived more openness to both behavioral and ideological change. We posit that the well-established neoliberal development paradigm in place prior to the strife had not only acquainted Uttargaon villagers with the language of revolution, but had increased their willingness to act as independent agents in the conflict and segregated the villagers among rival political parties (cf. Leve 2007; Sharma 2006). These changes were aided

by the structure of the kin networks we examine here, and affected the ways Humlis experienced conflict. By contrast, Paschimgaon villagers' relative reluctance to engage with development agents and programs meant that they were more insulated from the changes to social relationships that Uttargaon villagers had experienced. Our quasi-experimental research design comparing the two villages (cf. Bernard 2006; Robinson et al 2009) reveals the ways in which villagers' perceptions of development programs and Maoist combatants alike was associated with subsistence and food security, and diffused through kin networks.

The Maoists targeted NGOs during the conflict as proponents of imperialist agendas (Citrin 2010; Bray et al 2003, Gellner 2007). In Humla District, this was occasionally violent. However, although the Maoists demanded "taxes" from the NGOs that operated locally, adhered to local pay scales, and hired primarily Nepalis, they did not forcibly demand their evacuation. One of the locally-operating NGOs that fulfilled these requirements continued its implementation of health-promoting technologies (smokeless stoves, pit latrines, solar lighting, greenhouses, and clean water projects) throughout the conflict in the fieldsite. This allowed us to analyze villagers' reactions to two seemingly different types of risks. On the one hand, there was political instability and the Maoist conflict. On the other, there were risks associated with the adoption of new development technologies affecting some very basic concerns: food, heat, and polluting substances (human waste). The differences between the two types of risks were much less dramatic than we presumed, and their impacts on local people dovetailed. In fact, villagers did not typically describe these new and potentially risky 'innovations' as very different from each other at all. They both challenged villagers to radically change behavior.

Research Design

During interviews in 2009 and 2010, we gathered information in 308 household surveys and conducted 12 months of participant observation on individual and household decision making and vulnerability. In addition, we collected geospatial information using a large, printed, panoramic photograph of each village generated by the research team (for each village, a series of photos were stitched together using Autostitch software). Villagers identified their field locations and the households of relatives on the photographs. In order to examine the ways in which the character of social networks might correlate with risks (cf. Carter 1997), we generated GIS data by assigning a numeric identifier to and plotting the coordinates of each household with a Vista HCx Etrex Garmin GPS in the field. We obtained high resolution imagery (18 cm) from Digital Globe, taken from satellite images from 2004, allowing for the digitization and analysis of information from the field photographs *post hoc*. We then mapped 802 consanguinal and affinal relationships among the 128 households and 25 lineages of the two villages in Esri's ArcGIS v 10.

We represented kinship data using the ArcGIS XY-to-Line feature to create a map of the relationships recorded in the two villages (each line represents a relationship). Symbols portray each household's level of development technology adoption and conflict participation garnered from seasonal interviews with male and female household heads in the 128 households in the fieldsite. They demonstrate varying patterns of associations between kinship and risk for lineages of the two villages. Statistical analyses in IBM SPSS 20 enhanced the geospatial analysis and quantified the distance associations revealed in ArcGIS. Qualitative data, captured in fieldnotes and coded in NVivo, provide explanations for the mechanisms by which the quantified associations operate, and contextualize the findings. We believe findings resulting from this

micro-level analytical approach are applicable in many respects to other remote regions, due to the rapid and pervasive impact of international aid on poor, rural regions of the developing world.

Humli Kin Networks

As of 2010, Paschimgaon had a population of 420 individuals in 67 households in 13 lineages, while Uttargaon housed 386 people in 61 households belonging to 12 lineages. Migration patterns based on the consanguinal and affinal relationships of villagers in the fieldsite show Humla's position at the periphery of the geographic reach of the Nepalese government (Figure 2), and also reflect important differences in the structure of kinship in the two villages (Figure 3). We suggest the differences were intensified by varying levels of engagement with development, and mediated villagers' responses to the conflict. In Uttargaon, we see far more relationships external to the village, denoting Uttargaon's relatively higher degree of external social capital (cf. Strang & Soule 1998), or long-distance kin relationships. Uttargaon villagers are more willing to travel outside their village in search of familial and economic opportunities due to their relatively poorer agricultural productivity. By contrast, ArcGIS representation of Paschimgaon's kin networks revealed a denser structure that was verified by comparisons of kin network distances in SPSS (Table 3). These differences persist despite the villages being of similar size, religious orientation, ethnic make-up, and geographical location.

Integration with cash economies since the early 1990s has offered (certain Humli villagers) alternatives in the form of businesses (e.g. the sale of herbs, manufacture of wooden bowls, wage labor in urban centers, and the resale of cheap Chinese products) that promote temporary or permanent emigration from the area. Mobility connected villagers with nationally

and internationally-espoused ideas that reduced the foreignness and risk inherent in long-distance connections and travel. It is essential to both traditional (Furer-Haimendorf 1975) and modern Humli livelihoods. *Dzopa* (the cold-adapted yak-cow crossbreed) allow Humlis to travel throughout upper Humla and conduct trade in China. Uttargaon households had significantly higher numbers of *dzopa* than Paschimgaon households, accentuating their greater reliance on mobile livelihoods. Large pack animals are also symbolic of Humlis' ability to obtain better social standing and achieve a more modern lifestyle in this roadless district (cf. Truitt 2008). Today, villagers use large animals like *dzopa* primarily to transport goods from China for sale and consumption in their home village.

Uttargaon households also adopted more technologies (stoves, electricity, greenhouses, and pit latrines), at a mean of about two new NGO-introduced technologies, compared to Paschimgaon villagers' one technology per household. Given ethnographic data confirming a difference in development orientation between the villages, and due to the small number of technologies available for adoption in the fieldsite, this difference was statistically as well as, we believe, culturally significant. Stoves were the earliest implements of any of the technologies we examined. At the time of conflict, Paschimgaon villagers had adopted far fewer stoves than villagers of Uttargaon (Figure 4). According to GIS imagery and statistical analysis, stove, latrine, cell phone, and other development technology implementation occurred significantly earlier/more pervasively in Uttargaon (Table 4), corroborating what we had observed and heard from NGO staff.

People of Uttargaon had responded enthusiastically to development opportunities that took them outside their home villages because at home, the steep and dusty hillsides intended for food held little but the unrealized hope of security and well-being. Population pressure,

Uttargaon's proximity to neighboring villages, and the poor quality of their unirrigated fields meant that business opportunities, NGO training and workshops, and the search for wage labor outside the village represented the potential and/or actual relief from scarcity and land disputes at home. In interviews, villagers' explanations for their motivations to build latrines, for instance, usually involved eyewitness accounts of urban places in China or Nepal where both development and latrines were taken for granted. Stoves were a way to cook more cleanly, but they were also a measure of how "developed" the householders were, as well as a symbol of consumption (cf. Cahn 2008). In this vein, NGOs and other neoliberal development organizations were not only offering technologies, but a symbolic way out of the most "backward" district in Nepal for Uttargaon villagers (cf. Pigg 1992).

Conversely, the expertly terraced, irrigated rice fields of Paschimgaon afforded those villagers a great deal of pride in their traditionally agricultural livelihoods. For them, rice is both sustenance and a link to Hindu ancestors in a place where supernatural forces are embedded in the landscape and perpetuate access to food security (see Winkler 1984:47-8). Paschimgaon villagers took pride in their ability to maintain traditionally Thakuri rituals despite the rapid social change going on around them. According to our ethnographic research, NGO activities that espoused disruptions in food procurement processes and rituals within or without the village were viewed more as impositions on survival than opportunities by Paschimgaon villagers.

We wanted to explore a conventionally recognized connection between social network structure and engagement with neoliberal development (cf. Foucault 1991; Morin 1952; Truitt 2007) by looking at the relationships between kinship networks and the uptake of development technologies for both villages. Patterns suggested that the more densely-related Paschimgaon villagers often shared adoption patterns with other members of their kinship groups. Eighty

percent (11 of 14 lineages) of Paschimgaon's kin networks shared patterns of new technology adoption (Figure 5 shows a kin network exemplary of this trend). Paschimgaon villagers engaged in innovation, but they did so within the context of kinship.

In Uttargaon, by contrast, only 50 percent of the lineages exhibited the same adoption pattern within lineages. There, the behavior of one's kin did not appear to be nearly as influential as it was in Paschimgaon. The example of Uttargaon adoption in Figure 5 shows two-to-six technologies adopted within the same kin network. Indeed, in conversations, Uttargaon villagers had a great deal of pride about their education levels and business endeavors, while Paschimgaon villagers tended to boast more about their cultural knowledge and reputation as Humla's keepers of Thakuri traditions.

The first author was able to observe Paschimgaon villagers' use of social capital in resisting development organizations' programs that villagers were uncertain about investing in. Every time a NGO enters the village to institute development programming, it introduces opportunities to earn cash and gain prestige through leadership roles, and therefore plays a role in a village's political dynamics. Often, the development agents are unaware of the political undercurrent in a given village, and therefore stumble into and exacerbate the conflict (cf. Dema 2008; Fisher 1997; Leve and Karim 2001). Small disputes usually manage to thwart the benefits of even the best-planned development interventions. At the same time, and despite these divisive experiences of development and conflict, villagers are becoming more savvy about how to integrate their vision of development (*bikas*) with that of urban Nepali and foreign development agents, i.e. they are building their political capacity (cf. Gilligan et al 2010) through their kin and social networks. Development workers tended to see local people's resistance to their programs as ignorance, laziness, and politics for politics' sake, but long-term observation revealed that

when Paschimgaon villagers banded into groups to divide opinions about various development implements, they were usually able to negotiate with development workers for better wages and less labor investment.

Development trends like those described above that were more entrenched in Uttargaon, may have brought those villagers more fully into the national political discourse, making them vulnerable to political maneuvering that put some people more at risk for conscription in that village (cf. Leve 2007). New political schisms inevitably accompanied the social-spatial reorganization of kinship shown in the differences between the villages above.

During and following the conflict that resulted in part from Nepalis' disillusionment with a democracy that was failing to provide material relief from scarcity (Gellner 2007; cf. Leatherman 2005), Uttargaon villagers did not simply throw off their age-old claims and grievances to adopt new ones. They also incorporated the titles of new political parties in a deepening expression of division. Landowner-versus-landless disputes gained new momentum when they took on these guises of national political parties and became the basis for retribution. Maoist combatants new to the area capitulated in local disputes by acting on behalf of villagers who claimed political loyalty.

Kin Networks in Conflict Participation

Like adoption of technologies, conflict participation patterns reflected kin network differences between the two villages. First, using GIS to explore female conflict participation patterns, we demonstrate the connection between conflict participation and kin networks. Next, we geospatially differentiate conflict participation on the basis of surnames to discuss the potentially protective features of dense kinship structures.

While in general and as a result of some enforced conscription, participation in the Maoist conflict was not always under the control of individuals, the 17 women who participated in the Maoist campaign from the fieldsite disproportionately exercised their own wills in order to do so, compared to male participants (Figure 6). Because most women conflict participants chose to participate, a gendered GIS analysis best highlights the influences of kin network structure on Humli decision-making in the conflict.

Women in Nepal have traditionally adhered to the narrow and patriarchally-prescribed social roles prescribed by Hindu religious norms. Throughout Nepal, the combination of Maoist rhetoric about gender equality and rural patriarchal customs led to larger-than-expected numbers of women joining the Maoists of their own volition (Leve 2007). Young, unmarried Humli women from the fieldsite who chose to join the Maoist cadres tended to see it as a socially acceptable (because conscription was rhetorically mandatory) opportunity to explore new social roles they had heard about through their peers at school and in the media, and to see other, more developed, parts of the country. They often justified their volunteerism in terms of *dharma*, or social obligation. For instance, several women in the fieldsite volunteered to take the place of a brother in the cadres, thus allowing the household to retain a more valuable source of labor for the duration of the conflict. Not only do men have more mobility compared to women, which allows them to conduct business in distant villages, but unmarried daughters are not expected to work as hard as, for instance, daughters-in-law, in this patrilocal society. Most unmarried daughters eventually get married and move into distant marital homes, thus incurring a loss to the household's labor force (cf. Bossen 1988; Schlegel and Eloul 1988). Households prepare for this loss by assigning daughters non-central labor roles. Young women who had no other opportunity to see the world before being bound to their traditional social roles used the Maoist

presence and local norms to their advantage. In general, female volunteers for Maoist duty came from lower status homes in which there were few other opportunities for upward (or any other kind of) mobility.

Because women exercised choice with the Maoists to a greater extent than the men, we could compare the ways in which social relationships in the two villages may have mediated female participation in the conflict. In Uttargaon, we found that the women who participated in the conflict were from quite a few different lineages. However, in Paschimgaon, only two lineages capture nearly all the female conflict participants in the village, conforming to the patterns of kin-influenced decisions we have seen thus far (Figure 7).

The households in which women opted out of conflict participation, on average, were related to 29 nearby households, or five more than those from which women participated in the conflict. In order to examine whether kinship was a factor in conflict decisions, a look at surname relationships to conflict tells us more about how the density of nearby kin networks may have contributed to or protected individuals from the traumatic effects of the conflict. In this surname-exogamous, caste-endogamous Thakuri community, Bahadur is the minority and slightly lower status of the two Thakuri surnames in the fieldsite (Table 5), but this group had the advantage of easily finding nearby mates and cultivating denser kin networks than the Chaudarys via marriage. In terms of conflict participation, the higher-status Chaudary families were more likely to have longer terms in the Maoist campaign (Figure 8; Table 6). This finding contradicts theories predicting high-status individuals' relative lack of participation in guerrilla campaigns (Ballentine and Sherman 2003; Scott 1976; Wolf 1969), and suggests that affinal cooperation protected the Bahadurs from conflict participation, despite their lower status (cf. Pettigrew 2004). When we asked who in the village he was related to, several Bahadur respondents

answered “the whole village is my family”. In a place where kin relationships often direct the flow of goods, information, and social support, this was a powerful statement to be able to make.

Although most theories of conflict predict decision-making based on social or socioeconomic variables, social status effects on participation in Humla were mediated in part through kinship. The denser the kin groups, the less likely people were to participate in the conflict. In Paschimgaon, even the less dense kin groups made their risky decisions in more-or-less the same ways, while Uttargaon villagers exhibited more independence from kin networks in their behavior. Throughout the fieldsite, differences in kin network density appeared in Arc to be related to differences, both in resistance to the Maoists and in level of engagement with development programs.

In surveys, Uttargaon villagers mentioned that they experienced more social disturbances during the conflict as a result of political divisions within the village. Ultimately, this led to harsher conscription of the polarized villagers. Uttargaon villagers also took on greater risk in order to escape Maoist terms (Table 7). We suggest that this was partially the result of prior, successful development that had facilitated the connection of these villagers’ social networks to those of national and international political and social groups in lieu of more local relationships and traditional kin institutions. Paschimgaon villagers were more naïve in the same negotiations, but the proud social supports and disinterest in national level politics accompanying their tight-knit, kin-based social connections may have shielded them from the divisive effects of wartime politics and the conscription process.

Discussion: Neoliberal Expressions of Risk-Taking?

As these findings suggest, recent changes in social institutions and networks brought about by increasing integration with a market economy and other outside influences are affecting Humlis' experiences of and responses to increasing political tensions. Specifically, we found that those villages that had experienced more development activity had socially divisive experiences of the Maoist conscription process due to political polarization and incorporation of national agendas in a heretofore remote community, compared to villages with less development activity.

Humlis' social acceptance of conflict participation was unexpected, and pointed out the complementarity in villagers' engagements with development and conflict. Statistical analyses revealed a significant positive correlation between conflict participation terms and technological adoption for both villages. Critics of neoliberal development regimes tend to regard their unravelling impact on traditional kin relations (like those observed in Uttargaon) as unique to the development realm, but the observations detailed above reveal that these processes are not strictly "neoliberal". They stemmed from traditional social arrangements and agricultural inequalities (cf. Aiyer 2007) and they were also intensified by unlikely allies, the Maoists (who are now in charge of the government; cf. Kipnis 2008). The Maoist campaign in Nepal served to mobilize people across space, privilege national identities above ethnic/religious ones, advocate for gender and caste equality and education for all, and emphasize market economies as a means to raise up the poor, all of which helped to stretch and extend the social nexuses of Humlis who were in a position to benefit, i.e. those who had already begun this process through development opportunities. Villagers saw the Maoists as a) agents of development who could bring them technical help, much as NGO or government workers had done in the past, and b) outsiders whose motives required wariness, as with NGO and government entities.

Both the Maoists and the development workers, then, theoretically presented a conundrum to villagers who wanted the development and the symbol of progress that they brought, but who were suspicious of what they might be asked to give up in return. They had been on the unfortunate end of asymmetrical development, largely due to their position at the geographical margins of Nepali society, since unification in the late 18th century (cf. Fisher 1986), and had reason to be cautious. In response to the risks presented by outsiders, villagers drew from the resources locally available to them represented above using GIS, but, for Uttargaon villagers, some of those resources, i.e. kin networks, had already begun to dissipate.

Unfamiliar events and processes confer great risk to individuals, especially if those events and technologies affect the ways in which people can earn or provide a living or relate to one another (Carter 1997; Rogers 1995), and changes in social institutions are often accompanied by increased uncertainty and the threat of violence (cf. James 2012). The major changes affecting Humlis' lives in the past generation have been ecological declines that limited the food security and nutritional diversity of their resource base, rapid development processes that stretched and expanded the social resources on which individuals rely to mitigate risk, and the Maoist conflict that brought national-level political upheaval and violence irrevocably to their doorstep. These change processes combined in unexpected ways to create vortexes of vulnerability observable in ArcGIS to which only certain individuals were relatively immune, based by all appearances on the structure of their historically-situated social relationships.

Conclusions

This analysis suggests that development facilitated the kinds of long-distance kin relationships and non-kin social connections that ultimately politicized certain villagers and

made them more vulnerable prior the conflict. The politically-savvy-but-divided villagers seemed to experience harsher conscription. Increased vulnerability operated through the byproducts of successful development endeavors that introduced alternatives to especially poor agricultural productivity among Uttargaon villagers, but may have left individuals more isolated in their home village.

Other research has countered that, in places where conflict experiences were more traumatic, higher rates of social cohesion may accompany the end of conflict (Gilligan et al 2010). This analysis' referral to pre-conflict processes is not meant to assume their persistence throughout post-conflict change processes. There is some ethnographic evidence that cohesion increased for Uttargaon after the conflict, despite their during-conflict divisiveness. During 2009 and 2010, Uttargaon experienced fewer within-village disputes but more between-village conflicts than Paschimgaon, so the long-term social benefits of conflict are dubious and require further investigation. This analysis has shown that dense kin networks may help absorb risk. Future research should further articulate how external (long-distance) versus internal social capital in kin and other social networks affects vulnerability.

GIS analyses are helpful for observing and communicating social findings to development agents for the improvement of development programming. The images appeal to visual and spatial thinkers, thus reaching diverse segments of development practitioners and scholars. The maps may also serve as a foundation for easier data acquisition and application by change agents in the field. For example, we are currently working with an INGO in the health sector in Humla District to collect health and other social network information to add to our ArcGIS exploration of vulnerability in Humla. Compared to social network analysis software, ArcGIS' geospatial capacity allows for a much more sophisticated set of analyses in regions like

Humla where steep topography, difficult terrain, politics and socio-economic life are integrally linked. Additionally, relationship maps in ArcGIS revealed patterns otherwise unexpected or obscured by the multidimensionality of social capital, and in our case led us to inferential statistical analyses that improved our understanding of patterns on the ground (for instance, ArcGIS representation of the difference in surname social network densities alerted us to the statistical analyses that confirmed the significance of the observed difference).

Anthropological practitioners have the potential to contribute to GIS by accumulating remote sensing data that complements and contributes to the accuracy of larger databases, especially for places like Humla District, generally left out of national-level/ macro studies of vulnerability. Going forward, anthropologists will be able to mobilize Arc tools for inferential analyses to a much greater degree than we have to date. We have the opportunity to incorporate ethnographic information in microanalyses of geospatial dynamics in novel ways that lend themselves to applications of anthropological knowledge.

The ethnographic analysis provided here references the ambiguity of the term "neoliberal development", whereby traditional animistic and Hindu concepts of the self and community found fertile ground for growth in two modern, ostensibly opposing entities: the Maoists and "imperialist" proponents of aid. International aid and conflict have a lot in common, in that they are forms of revolution that are usually imposed from the outside. More importantly, they are made up of actors who have a somewhat unified vision of a better world, but who are nevertheless simultaneously navigating the competing goals of self, family, community, nation, and world. The way locals perceive themselves connected to those various scales of kinship will determine the social resources at their disposal to negotiate both reality and idealism in increasingly scarce environments (cf. Mains 2012).

There may be alternatives to the instability that neoliberal development efforts can cause in developing world contexts through their tendency to stretch, divide, and lengthen social networks (James 2012). In light of the effects of social networks on vulnerability revealed in this paper, we recommend that development organizations aim to reduce the risk of upheaval and instability by first identifying existing social networks (kin and otherwise), and then developing plans to work within and to strengthen them in ways that do not increase the social distances between groups.

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Figures/Maps

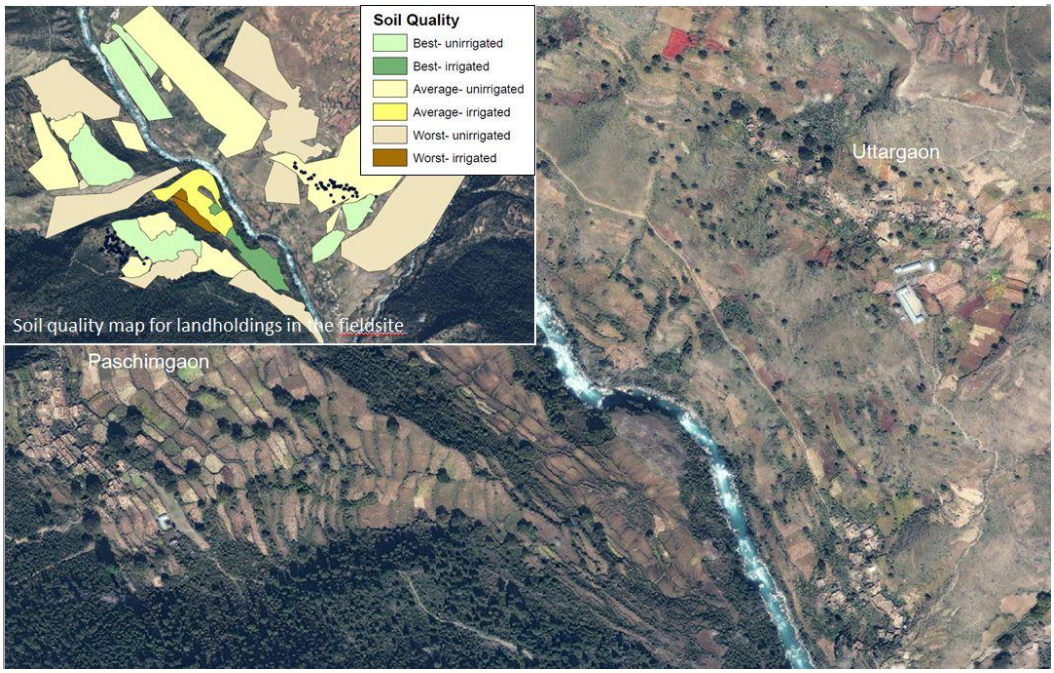

Figure 9. Distinctive ecologies of the fieldsite

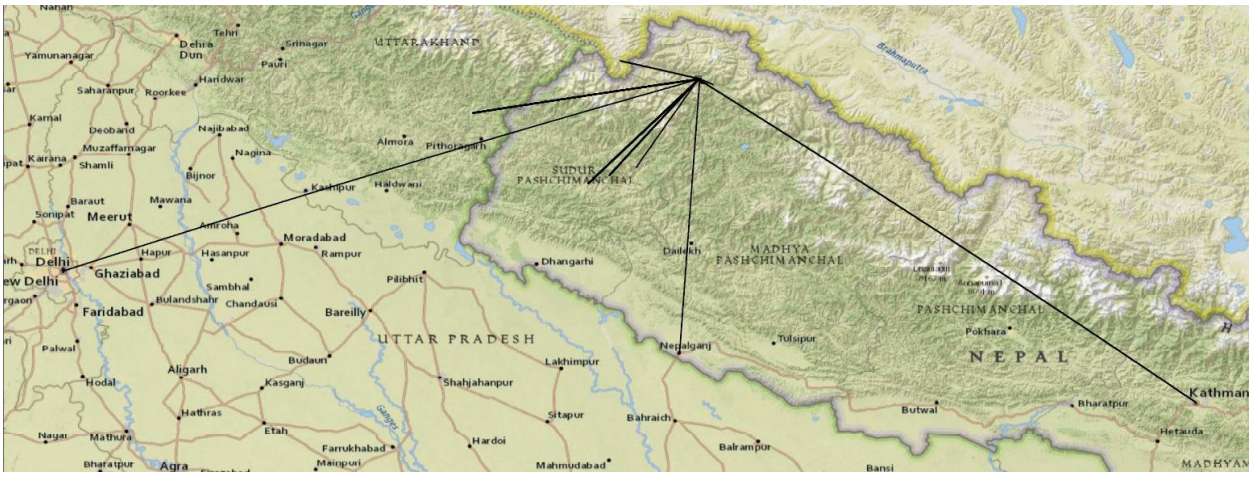

Figure 2. Humlis have far more kin connections to the west, in India and China, than in urban centers in Nepal

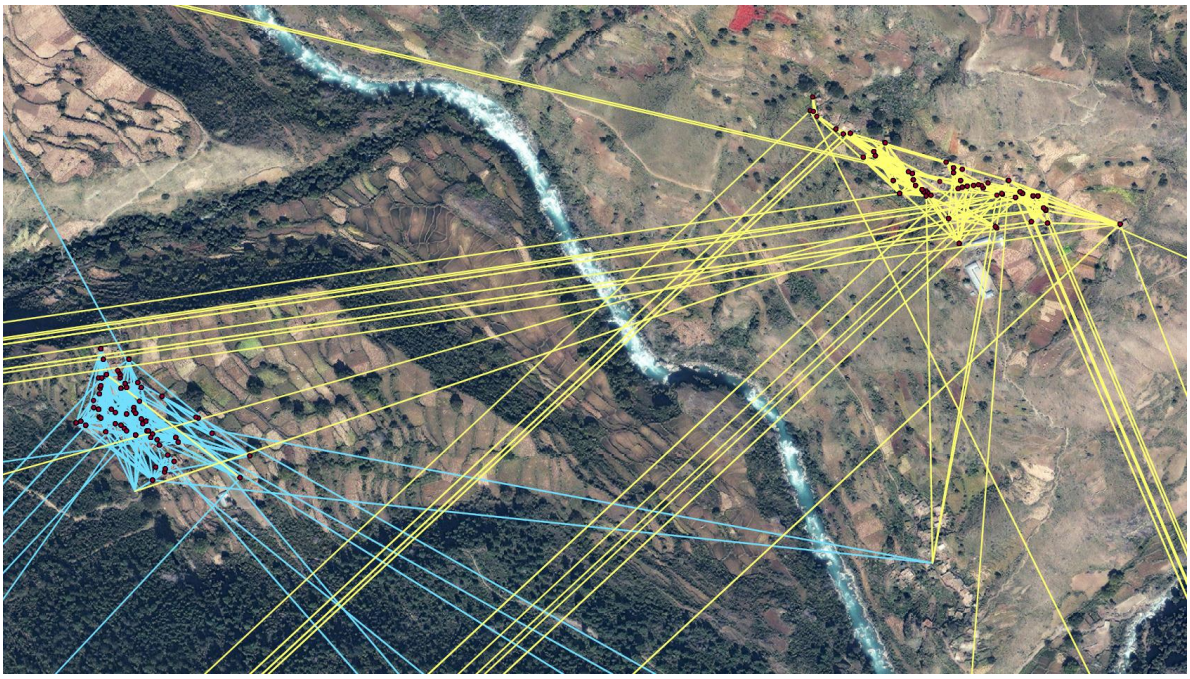

Figure 3. Compared to Paschimgaon, Uttargaon has a less dense kin network structure with more outside connections

Figure 4. Most Uttargaon villagers adopted development technologies prior to the conflict's heightened influence in Humla District in 2003-4.

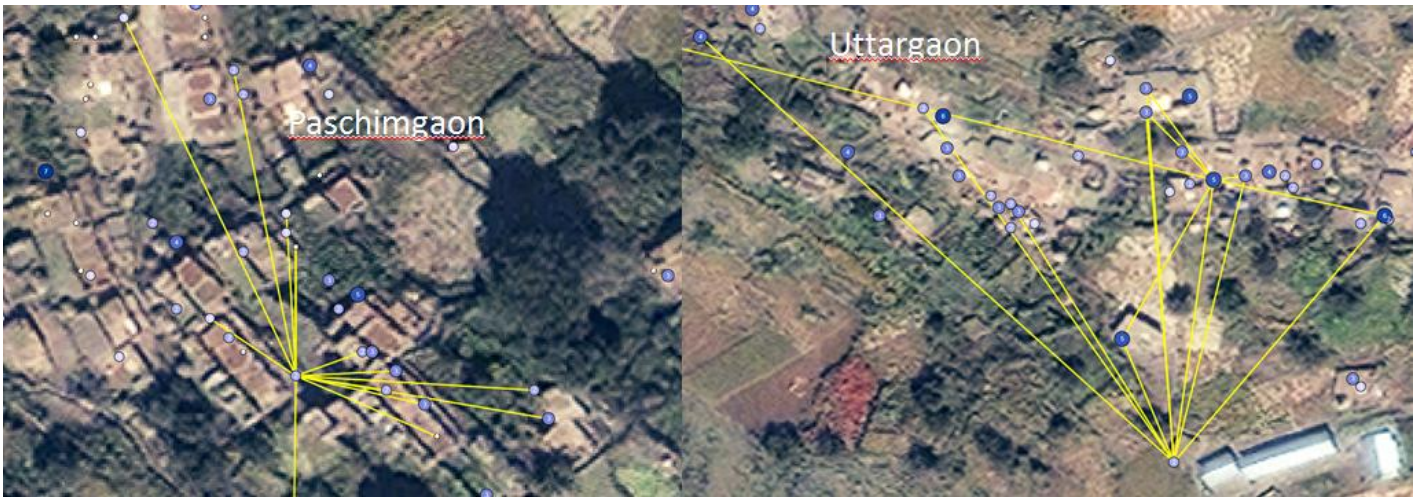

Figure 10. The number of technologies adopted by Paschimgaon kin groups like the one pictured above exhibited conformity, while in general, Uttargaon kin groups did not make the same decisions about technology

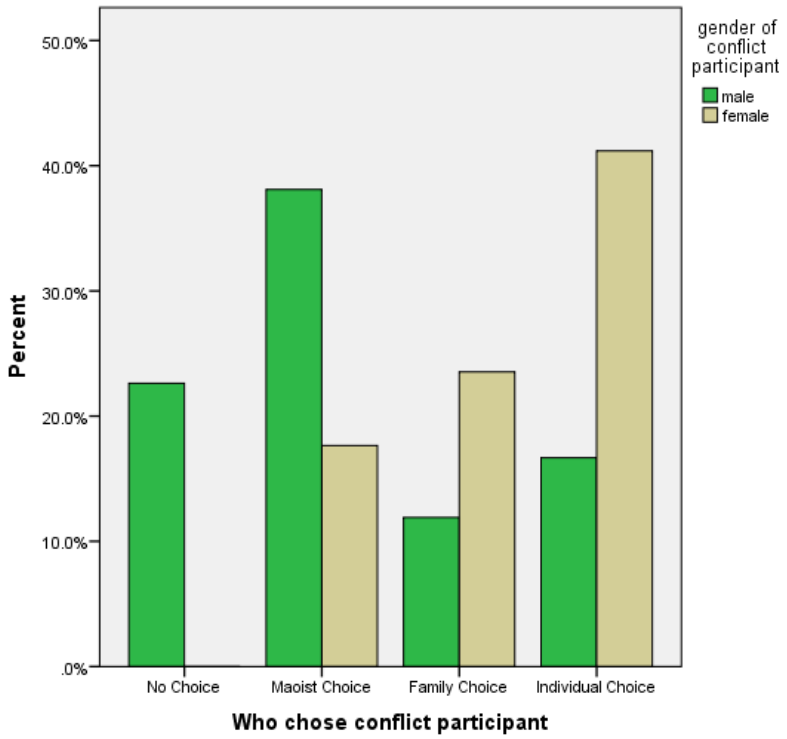

Figure 6. Females who joined the Maoists did so of their own volition more than males

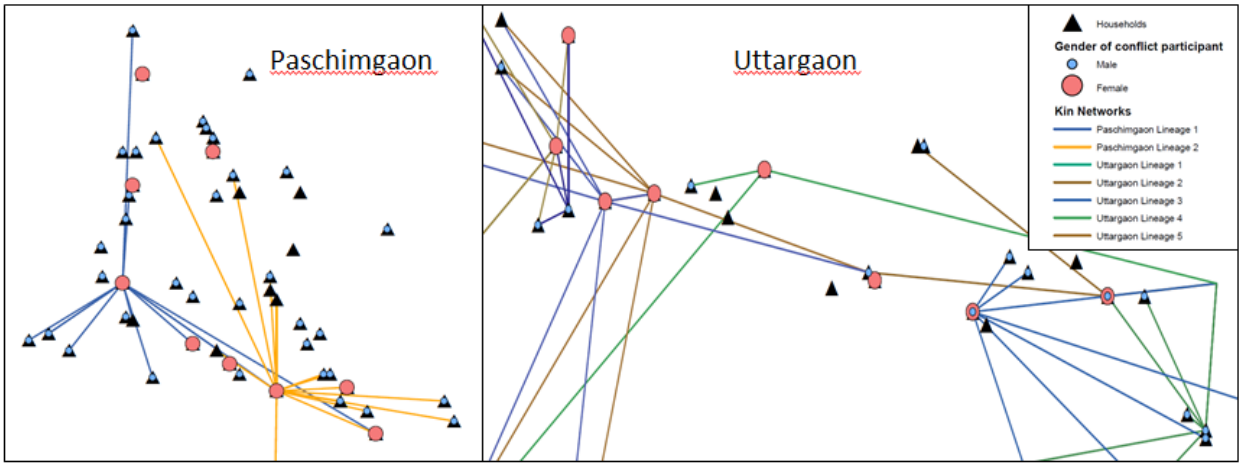

Figure 7. Female conflict participants from Uttargaon were from multiple lineages, but nearly all of the female conflict participants from Paschimgaon were from just two lineages

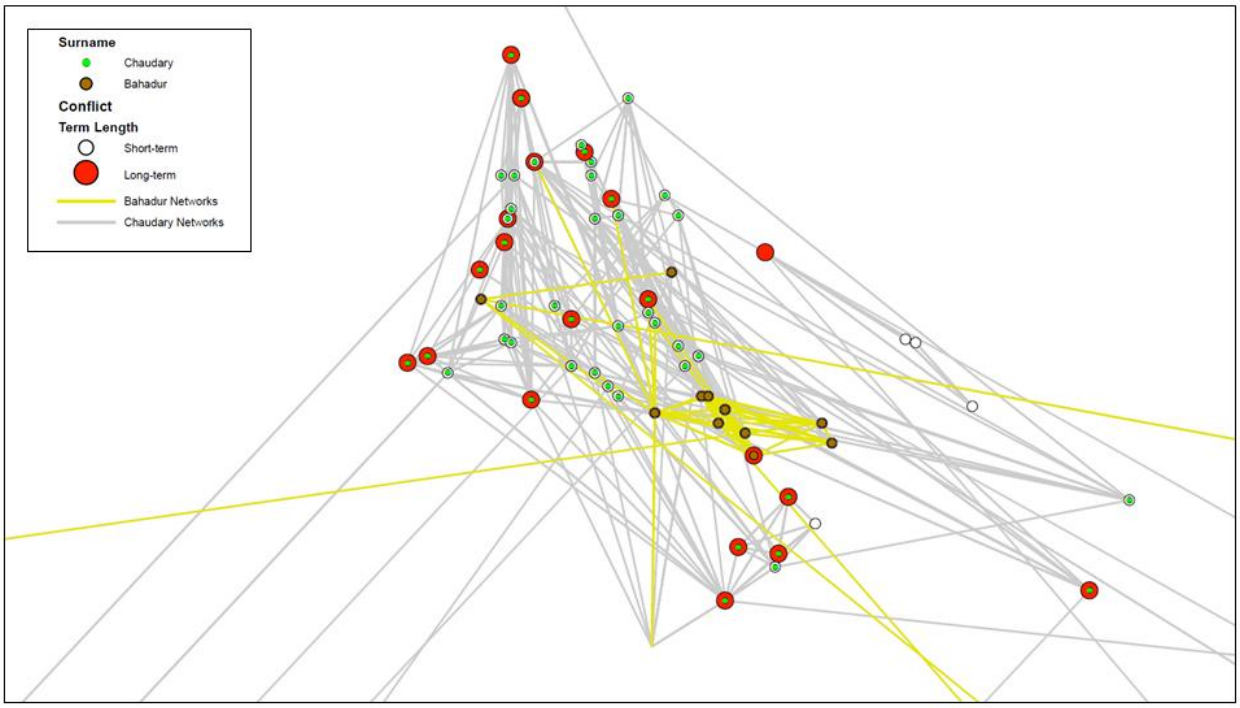

Figure 8. The lower-status Bahadurs escaped the long term-lengths to which the Chaudarys were disproportionately subjected

Tables

	Village	N (households)	Mean
Total number of technologies adopted **	Paschimgaon	67	1.72
	Uttargaon	61	2.72
Number of health technologies adopted**	Paschimgaon	67	1.22
	Uttargaon	61	1.72
socioeconomic status*	Paschimgaon	67	1.5701
	Uttargaon	62	1.7565
Total income (in Nepali rupees)*	Paschimgaon	67	16490.07
	Uttargaon	61	21987.79
Education per # people in household **	Paschimgaon	67	1.4731
	Uttargaon	61	2.4480

Table 5. Statistically significant village differences in level of 'development'.
****= significant at p<.01; *= significant at p<.05**

	Village	N (households)	Mean
Months of food security this year**	Paschimgaon	67	2.9851
	Uttargaon	61	1.4781
People suffering gastrointestinal problems*	Paschimgaon	63	.3810
	Uttargaon	58	.6552
People suffering respiratory problems**	Paschimgaon	53	.1132
	Uttargaon	48	.5833

Table 6. Statistically significant village differences in well-being.
****= significant at p<.01; *= significant at p<.05**

	Village	N (Kin Relationships)	Mean
Distance from kin (meters)**	Paschimgaon	427	4782.35
	Uttargaon	375	12885.5

Table 7. **=significant at p<.01

	Village	N	Mean
years ago stove was adopted**	Paschimgaon	39	4.5000
	Uttargaon	50	5.9333
number of stoves adopted**	Paschimgaon	67	.61
	Uttargaon	61	.95
latrine adoption**	Paschimgaon	67	.4925
	Uttargaon	61	.7213
years ago latrine was adopted**	Paschimgaon	26	4.5577
	Uttargaon	32	7.1406

Table 8. **=significant at p<.01

Surnames		
	Frequency (households)	Percent
Chaudary	103	79.8
Bahadur	15	11.6
Dalit	4	3.1
Other	6	4.7
Total	128	100.0

Table 9

	Surname	N (individuals)	Mean
Less than one month participation*	Chaudary	100	.4200
	Bahadur	15	.8000
long-term participation*	Chaudary	100	.4200
	Bahadur	15	.1333
Maoist army service**	Chaudary	101	.0693
	Bahadur	15	.0000

Table 10. Statistically significant surname differences in conflict participation
**= significant at p<.01; *= significant at p<.05

	Village	N (individuals)	Mean
Risky avoidance of Maoist service*	Paschimgaon	71	.1268
	Uttargaon	62	.2903

Table 11. Statistically significant risk-taking to avoid forced conscription
*= significant at p<.05

Conclusion: Fierce (In)Dependence and Cultural Persistence in the Future of Development in Humla District and the Global South

In this ethnographic research, explanations of decision making about development brought together the diverse fields of risk and risk management, diffusion of innovations, vulnerability and biocultural/livelihood coping strategies, and health seeking. Loosely defined and spanning multiple scales of analysis, development constitutes a common element in the changes taking place in Humla shaped by and profoundly influencing villagers' decision making processes and vulnerabilities. In conclusion, this essay explains the definitions of development to which this study alludes but does not wholly fit. In so doing, it discusses the dissertation articles within the context of the development encounter in Humla and, by extension, the Global South. Then, it describes the implications of the healthcare seeking transition and other development-initiated transitions for the people of Humla, and finally, explores potentials for progress that simultaneously honor the cultural traditions villagers martial to mitigate risk.

Clearly, Amartya Sen's (1999) frequently cited concept of "development as freedom" was not the type of development recently implemented in Humla District. Hypothetically and ideally, freedom from need and freedom to choose may have been the primary goals of most of the development workers I spoke with in the fieldsite, but these outcomes have yet to materialize in most respects. If it is difficult to measure risk-taking in conflict due to enforced conscription, this research demonstrated the (unintentional or no) coercive properties of development initiatives as well. Where it exists, development's violence for the people of Humla is a structural violence (Farmer 1996) that disempowers local people through asymmetrical exchanges and ideological hegemony. Sen also pointed out that social, economic, and political freedoms are important components of both the *process of developing* and the outcome. But Uttargaon residents suffered such food deprivation that they were nearly as compelled to accept

the development 'carrot' as a revolution because both processes introduced change, and in Humla, the devil you do not know may be the lesser evil, i.e. relief from chronic scarcity.

In the absence of black-and-white contexts of development-as-freedom, it was the neoliberal development model that dominated aid processes as well as markets in Humla, following the current trends in global development. 'Neoliberal development' may refer to one of several interlinked concepts: the unmitigated reign of the free market even in development assistance; development programming suited to rational actors ever-engaged in cost-benefit decisions and transactions; development initiatives built on donor-derived targets and measured by quantities, rather than qualities, of programs; and, the decentralized and piecemeal NGO-operated development system that arises as a result of the devolution of power to myriad organizations instead of an overarching state apparatus (cf. Comaroff and Comaroff 2000; Elyachar 2002; Ferguson and Gupta 2002; Pfeiffer and Chapman 2010; Simon 2003).

However, 'neoliberal development' in Humla, neither as violent as the Maoist conflict nor as empowering as its proponents would hope, takes a similar form as 'communism' in Humla manifestations, because they share some basic foundational ideologies, and, in the fieldsite, are both uniquely Nepali hybrids. For example, healthcare development in Humla, though currently driven by the millennium development goals and the 'NGO era' of healthcare development, was built using the health infrastructure of an earlier era of development in Nepal and the world. That model, incorporating principles from the Alma Ata conference of 1978, resembled the Cuban primary health care (PHC) model that was more focused on long-term, holistic healthcare than curative medicine (cf. de Vos et al 2009; Odaga 2004; Whiteford and Branch 2008). Unlike the Cuban case, though, Nepal's PHC program lacked a strong government with an overarching program of implementation (LaFond 1995). Rural Nepali health

posts touting absentee health workers are still supposedly part of a multi-level PHC referral system, the links of which have broken or were never linked in the first place. The posts nevertheless serve as popular health-consultancy centers of choice for Humli health queries. Many of them have been overtaken by NGOs and adapted to the neoliberal model that espouses curative and decentralized care. During the conflict, health posts were sites of contestation over which Maoists and the monarchy-led government forces competed in order to control flows of medicine and people, as well as to ingratiate themselves with local people (Citrin 2010). In so using them, the Maoists implicitly supported a neoliberal-socialistic hybrid clinic system as a way to uplift the downtrodden. In this and many similar cases, "neoliberal development initiatives" are not always exclusively neoliberal, and certainly are not static entities.

Indeed, it is this very 'uplifting of the downtrodden' as a means to political ends, along with an emphasis on economic growth, that made the Maoists and development workers less distinguishable than, perhaps, both sides had hoped. Despite the prevalence of altruistically-expressed development intentions, much of the language surrounding neoliberal development makes no bones about Marshall-esque intentions to spread democracy and win over enemies through the politics of development (Schirch 2010; Therien 2010). Development is not often the ends, but a means to some other strategic goal. It is also now popularly proposed as an effective conflict prevention measure in defense circles (Natsios 2001; Silinsky 2010).

It might even work as such, if development programs were more successful and less complicated in general, but Nepal's insurgency began and was the most intense in areas where USAID involvement was the highest (Khadka 2000; Shrestha and Bhattarai 2003), and my study has outlined the mechanisms by which this paradox may occur. Far from mollifying the masses, some of the greatest impacts of development programs in Humla were the social and political

divisions created and deepened by the diffusion of novel knowledge, innovations, and development-related opportunities. In the villages during fieldwork, these divisions became visible during shouting matches at political rallies, outbreaks of inter-village retaliatory violence, within-village disruptions in traditional ceremonies as a result of political differences among villagers, and riots in the district capital in 2010 in response to negotiations over the Nepal constitution at the national level. Ostensibly these events were related to the Maoist conflict or post-conflict political upheaval, but this study has attempted to show that the seeds of conflict had been sown prior to the Maoist uprising. It also problematizes our notions of development insomuch as they can be applied to the Maoists as well. That is, by certain definitions of development, the Maoists were very much agents of development. Like the people who worked in development, they helped instigate social and material changes that had both negative and positive consequences for Humlis, and pushed them deeper into transitions that multiplied vulnerabilities.

Stove (and Other) Sagas

People who worked for development organizations did not facilitate social divisions intentionally, nor were they ignorant of the shortfalls of the programs they implemented. By and large, they seemed to have the best interests of villagers, insomuch as they were aware of them, at heart. Some of the development problems could have been solved by conducting more extensive ethnographic baseline research prior to implementation, but many could not have been predicted and were only visible in evaluation stages of development, provided the organization conducted *bona fide* follow-up research on their initiatives.

One of the most popular, successful, and active NGOs in the region did in fact conduct considerable baseline information on preventative, not just curative, health innovations. This was

the organization that designed and implemented what they hoped would be culturally-appropriate cooking technologies, greenhouses, clean water projects, toileting systems, and clean lighting systems. Stove implementation was one of the most locally acceptable programs, and provides a powerful example of the unforeseen problems with development projects as well as of the power of follow-up research in international development assistance. Integrated Development for the Nepal Himalayas (IDNH)[9] had designed a smokeless metal stove in consultancy with an engineer who had researched local cooking methods. The engineer was passionate, committed, and diligent about making the stove as efficient as possible under the ecological conditions of the region. He performed repeated tests to ensure the stove's ability to reduce harmful pollutants in the household. The resulting stove was light, and therefore easily transported, and had three "eyes" for making the local *daalbhaat* (beans, rice, and curried vegetable). The rings were removable for the use of different sized pots, it had a slot for making *roti* (flatbread), and there was an attached water heater designed to boil water for safe drinking or hand washing. If used properly, the stove drastically reduced the amount of indoor air pollution in the small Thakuri homes lacking ventilation. If used properly.

Unfortunately, the foreign-born engineer in charge of the stove project in Humla had not taken into consideration the costs of "proper" use of the stoves. If the door on the front of the stove was left open, smoke came pouring out into the household, a phenomenon I witnessed many times during my stay, in individuals' homes and in my own kitchen. However, in order to close the door to save on energy usage and smoke inhalation, villagers would have had to chop their normal-sized pieces of collected firewood into thirds, tripling the work associated with each load of firewood that already entailed so much energy to procure. Also, the stove gave off less

[9] Pseudonyms have been used in place of organization names and village names.

heat with the door closed, and was a hazard for the children because it did not appear to be hot even when it might scald. Perceiving these barriers, not as design flaws, but as noncompliance on the part of the villagers, this engineer made a crusade out of the proper use of stoves to the extent that, when I visited inside local people's homes for tea, they often hurriedly chopped their wood and whispered at one another to get the stove door closed and re-attach the clunky water heating receptacle, because I was white, and was probably as obsessed with closed stove doors as the other white guy.

In theory, the engineer's ethnographic background enabled him to design a well-suited-to-the-locale stove. In actuality, other design issues overcame the intent. If that were all, the problem may easily have been addressed by tinkering with the stoves' design after careful observation of pilot studies in follow-up research. However, the very passions that tend to propel the commitment of foreigners to development assistance in this unglamorous and remote part of Nepal may undermine their abilities to effectively evaluate their progress. In the case of the stoves, it led to the engineer's retrenchment in his "culturally appropriate" stove design, and the resulting tension in his, IDHN's, and apparently other foreigners' relationships with the villagers. The unaddressed issues in stove design led villagers to believe that their complaints were not taken seriously (because they were not), and that the only way to go on receiving benefits from IDHN's activities in the area was through subterfuge and dishonesty. Just as NGOs only wish to give positive news to their donors for fear that negative news will cause reductions in their funding (cf. Hoy 1998), Humlis dared not openly reject any one of the development implements introduced for fear of losing access to future more appropriate and desirable technologies.

Most foreign and urban Nepali-born NGO staff start out just wanting to help. Their qualifications may not be terribly well-suited to the task at hand, like my own cattle shepherding

in the introduction, and we all tend to view the situation in Humla through the lens of our own affluence, but NGO workers at every administrative level, for the most part, genuinely care about the success of their projects for the well-being of local residents, and learn from their mistakes. However, they sometimes perceive and address needs that do not resonate with local people. This alone cannot completely derail a project. The long-lasting harm comes when NGOs and villagers together construct and reify a dynamic of polarizing tension that results from perceptions of ill-will on the part of each side (villagers vs. development assistance providers). In the drinking water, irrigation canal, orchard planting, microfinance, bridge-building, greenhouse construction, temple-cleaning, and health clinic projects I observed during fieldwork, this tension was ever-present, whether the implementing organization was governmental or non-governmental, international or regional, run by Nepalis or by foreigners. It often led to excruciatingly slow progress and the ultimately unsatisfactory outcomes of development programs (cf. Stone 1986).

If projects were so ill-suited, then, why did villagers bother with subterfuge? Why not reject development organizations and their programs outright? There are two reasons that became clear over the course of fieldwork: 1) "being developed" in rural Nepal comes with an automatic status boost (cf. Pigg 1992); and 2) however meager, there were often other beneficial byproducts of villagers' involvement in development projects that helped them procure food and other valuable resources on a short-term basis. Most organizations paid villagers, in rice or cash, for any amount of labor they contributed to a project. Figure 1 reveals the influence of such incentives on villager involvement, according to survey responses during fieldwork. This was another of the most detrimental aspects of development assistance for Humli independence and self-sufficiency. Now, when an irrigation canal is blocked by seasonal landslides, for instance,

villagers know that one of the over-200 NGOs registered in the district will be along to pay them to fix it if they wait long enough. When they come, it will be up to the NGO to organize villagers into groups, designate leaders, and construct a labor schedule. Humli villagers are not stupid. If they can fix what needs fixing with minimal effort and get paid in the process, why would they fix it on their own?

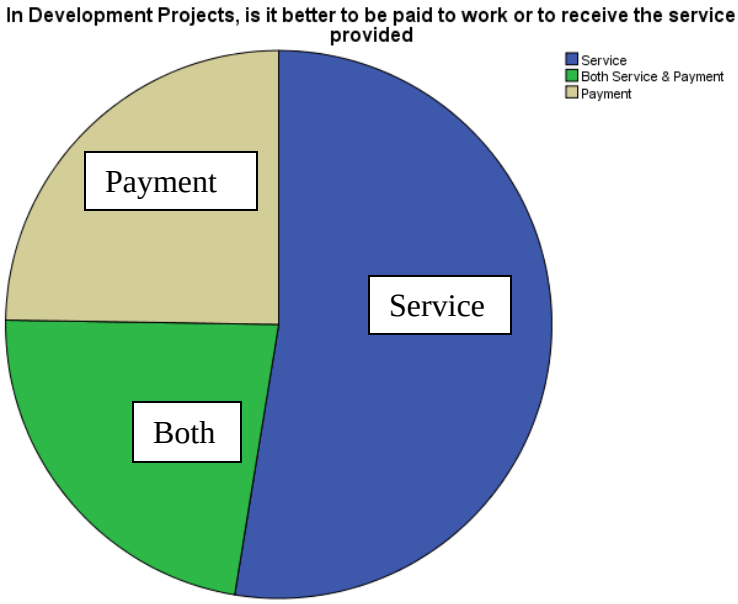

Figure1. Villager preferences about NGO benefits in 2009 and 2010

One such project took place during my stay in Madhyagaon. There, the irrigation system that enabled red rice production had broken in 2007, but, due to the prevalence of government white rice subsidies and NGO payment for labor, Madhyagaon villagers had opted to switch to maize production because it fared better under drought conditions. About the time maize yields were proving disappointing due to a seven-year drought in the area, one NGO facilitated a remedy to the canal in 2009. They paid villagers by the day, though, so the project drew out long beyond the original timetable.

Even the myriad problems caused by increasingly fractured politics among social groups in Humla could be ameliorated by addressing these two common problems in international

development. First, agents of development must recognize that villagers, albeit less educated or worldly than NGO workers, make quite reasonable decisions about the new ideas they confront. Among Humlis, one of the main reasons for so-called risk-aversion was the lack of observed efficacy of past development programming. If they are not doing something properly, it is usually evidence of a design flaw or lack of sufficient knowledge and/or experience with the technology in question (Rogers 1995). This knowledge, and its implicit recognition of local people as 'experts', will establish much higher levels of trust between villagers and change agents. In response, villagers will not have to view development actors as coercive agents from whom they must squeeze all manner of short-term benefits prior to the sacrifice development organizations so often demand from local households' scarce labor resources, or prior to yet another disappointing development project outcome. Further, the payoffs from those sacrifices will be higher due to villager-informed programming that results from a more trusting relationship.

Second, if NGOs can refrain from usurping the role of local and traditional resource management groups, their programs will be more sustainable in the long-run and they will be able to prevent the kinds of dependency-promoting development programming that only rhetorically is part of a bygone development era. Instead, if development workers are familiar with the local groups that, in Humla, form the organizing structure for rice planting parties, access to forest resources, and travel for trade, they can demand that those groups (re-)assume responsibility for the maintenance of shared resources in and around the village. When asked whether they would organize work parties for such tasks in the absence of NGOs, most villagers responded, "Of course". The problem is, this tact, if taken sloppily, will result in uneven

development and accusations of corruption, heard frequently in the Humla during the field research.

Development Transitions

Healthcare seeking is not the only piece of development creating vulnerability through contexts of transition in Humla (see *Technology & Innovation*). Opportunities and markets are far away, but the possibility of not working so hard, of profiting from a cash economy, is fully within Humlis' imaginations. One of the most unstable components of neoliberal development is talked about in terms of "the global imaginary" (Steger 2008) that constitutes a wide gap between the scarce conditions on the ground in the Global South and increasingly available (through communications technologies) images of the wealth supposedly obtainable by "rational man" (cf. Norberg-Hodge 1991). These gaps and the political identities that map them constitute fodder for conflict and risky attempts at self-or-group-actualization. In Humla and throughout the developing world, the 'transition' between real and imagined affluence and freedom may last indefinitely, as opportunities fail to materialize and expectations fall flat and turn into resentment.

As discussed in the introduction essay, the traditional concept of *dharma* among Thakuris constitutes a conceptual bridge during rapid development, in that it propagates notions of self-actualization (*aphno kaam*) side-by-side with rhetoric espousing social obligation and duty to the disadvantaged (see Winkler 1984). Critics of neoliberal development may ignore the pre-existing conditions under which traditional communities value self-determination and independence, as is the case in mountain communities that have existed as kinds of refugee camps for people fleeing the oppression of the state for millennia (Scott 2009). In refusing to acknowledge that neoliberal values are not within the sole purview of western hegemonic structures, critics of neoliberalism

fall prey to the same biases against the agency and innovation potential of local people as do many NGO workers.

Prospects for Vulnerability Alleviation in Dhami Traditions

As a state of transition, rapid development brings together, in the same time and place, aspects of both cultural persistence and innovation. The tendency is to see them as opposing forces, but cultural traditions harbor the seeds of change. In many rural regions of Nepal, shamanistic practitioners embody locally ancestral deities through ritual practice, and become the voice of those gods (*Masta*) in matters of general welfare and family fortune (Dahal 1973; Walter 2003). Throughout Thakuri communities in Humla, Jumla, Bajhang, and Bajura districts, these practitioners are called *dhamis* and are among the most respected social figures in their villages. In Humla and Jumla, they are chosen by the ancestral deities themselves, not by inheritance (cf. Dahal 1973), and are not allowed to participate in strenuous productive endeavors like plowing, harvest, and construction. *Dhami*s receive small gifts from their clients, but no regular payment, so becoming a *dhami* may entail economic strain on their households. Aside from performing their duties at religious festivals commemorating important events like planting and harvest, in which the gods must be beseeched to return to the village and reside in the fields, *dhami*s diagnose ailments according to which type of spirit may be possessing or rendering harm among their clientele, cast out evil spirits from the bewitched members of the lineages they serve, or offer animal sacrifices to deities so they will cease doing harm and offer their protection for the *dhami*'s clients. *Dhami* festivals also offer opportunities for family members to approach the god mediums to ask advice about planting and other family duties, so they might experience the gods' favor.

One Pashimgaon *dhami* in particular was visited by Thakuris from several villages because of his exceptional skill. Before the ancestors called him, he was widely thought to be insane. In this, the *dhami*s of Nepal share their incorporation of fringe members of society into the sacred with other animistic religions in other areas of the world (cf. Atkinson 1992). Like other religious practitioners worldwide, the role of the *dhami* is at once political, social, spiritual, and psychological (see Walter 2003). *Dhami*s' authority extends beyond matters of spirit, hearth, and home to include, especially, processes of change in the village. Among other village leaders, the *dhami*'s reputation for being in touch with the spirit world, and the norms that permit him to be somewhat of an outsider, bestow on him the capacity to predict and pursue change that other villagers may be reticent to consider (cf. Handelman 1967). The *dhami*s in the fieldsite took on this authority to varying degrees. A few were among the most 'progressive' of any of the villagers, the first to implement technologies, pursue outside earning opportunities, and engage with foreigners.

Thakuri people, at any rate, have a history of engaging in challenges to authority figures (cf. Winkler 1984). *Dhami* ceremonies may also be the sites of social hierarchical contestation. In Paschimgaon, near planting time in March, 2010, all the *dhami*s gathered to embody their ancestor gods and speak their histories. Villagers looked on as *dhami*s went into trance-states to channel the gods in a ceremony intended to honor ancestors in return for the protection of their crops. Despite the sacredness and import of this tradition, a certain nonchalance and playfulness was embraced. One older *dhami* even interacted with the camera during his 'trance', asking Chris to take photos of him by holding his hand in the shape of an 'O' up to his eyeball. The one and only *dalit*, or 'untouchable' caste, *dhami* made his trance-like way into the circular arena for his performance, too (he could not prepare with the other *dhami*s in the sacred space of the

temple, but rather had to enter from the side). Unlike the other *dhami*s, who each had their own style, the *dalit dhami* flopped about on the ground as if in a parody of his lower status. When one of the more prestigious *dhami*s entered for his trance performance, the *dalit dhami* seemed at once to challenge and to affirm his lowly position by kneeling before the other *dhami* as if submissive, yet his actions impaired the free movement of the other *dhami*, seemingly to call attention to the inequality (Figure 2). Reduction in inequalities was one of the main advantages Humlis cited as to the influence of the Maoists on villagers, but such equality is mostly just paid lip service. Ultimately, the *dalit dhami*'s son came into the ring to help remove his father with an embarrassed look on his (the son's) face. While these social divisions are not unique to *dhami*s in Humla, the events of this *dhami* ceremony were indicative of the changes being negotiated among the Thakuris of the fieldsite, and the potential role of *dhami*s as leaders of progress.

Figure 11. Performance of hierarchy in a *dhami* ceremony in the fieldsite. Photography by Chris Lombardi.

Despite this opportunity, few development organizations have made overt attempts to harness *dhami* authority for more successful projects among these notoriously "difficult" Humli villages. Developers have preferred instead to view *dhami*s as vestiges of past conservatism and thus problems to be overcome. *Dhami*s could recall only one set of trainings that occurred a few years prior to my research there, in which a NGO trainer coached the *dhami*s about what not to do: do not ask clients to sacrifice animals, especially larger, more expensive animals like goats, because it puts undue economic pressure on them; and, if clients complain about physical ailments, do not treat them, but refer them to the health clinics in the villages or the hospital in Simikot. To my knowledge, development agents have made no attempts to incorporate *dhami*s into a pluralistic healing regime like those successful projects documented in parts of Africa (see Bodeker et al 2006).

Yet, all of the *dhami*s I interviewed made distinctions between the kinds of ailments they should heal (headache, lethargy, loss of appetite), and those best treated by biomedical practitioners (gastrointestinal problems, breathing problems, heart issues). For physical ailments, traditional Thakuri healing ceremonies are led by the *dhami* and involve the whole family. These are often treatments as much for social conflict as for physical problems (cf. Janzen 1987; Walter 2003). The relationship between socially-instigated stress and physical illness is well-respected by villagers and *dhami*s in Humla District, so *dhami* treatments tend to deal more with psychological aspects of illness than the health clinics and hospitals in Simikot.

*Dhami*s are often instrumental in resolving conflicts in the villages. In several village arguments that we witnessed, we noticed the *dhami*s did not take an active part in the arguing, but stood off to the side and offered advice at less explosive times (Figure 3), seeming to maintain a mediator status. Indeed villagers often went to the *dhami*s for help and advice during

conflicts, although not exclusively. The *dhami* example is but one way the cultural persistence of *Thakuris* could serve to expand access to important resources in these villages. As of now, NGOs and other development assistance entities treat the *Thakuris* in the fieldsite as though they were much more passive than theyare. The *Thakuris*, in turn, act passively.

Figure 3. During a minor, village-wide argument during a local festival, the *dhami* (In a white turban at the back of the photo), stands by, but later offers advice to each side.

Implications

Development in Humla and throughout the Global South is neither wholly neoliberal, devoid of politics, community-based nor freedom-centric. It is processual (Pieterse 2002). While development initiatives are carried out by individuals and organizations with strong commitments to social justice, equality, and compassion, the structures that direct the benefits of development are superimposed on historical contexts of intra and international inequalities, and situated within the parameters of the neoliberal structure of international aid. For Humlis, this

meant, first of all, that outsiders tended to underestimate their ability to innovate and contribute to their own development, and secondly, that vulnerability and suspicion pervaded Humli interactions with development organizations and their staff.

Resourceful and proud of their heritage, this Thakuri-caste enclave in northwestern Nepal practices attitudes and dress that many outsiders view as impoverished, recalcitrant, and even a little sad. However, like other mountain people whose isolation and yet constant contact with more developed, 'lowlander' populations inspires fierce protection of cultural elements deemed unique and valuable (cf. Scott 2009), their conservative aesthetic is partially a product of coping with the myriad vulnerabilities present in mountain environments. Scholars refer to the flexibility of mountain-dwelling people (cf. Orlove and Guillet 1985), without, however, acknowledging that this flexibility (i.e. innovation) is borne of something quite 'traditional'.

The three data articles included in this dissertation speak to the intensification of Humli vulnerabilities due to the circumstances surrounding rapid development in Nepal. However, if development actors and Humlis alike acknowledged the ways in which *Thakuri* traditions may mitigate vulnerability to social fracturing, civil conflict, and sickness, the transition they are currently making to become a 'more developed' region may proceed more smoothly and with less fallout. It certainly cannot be halted.

Future research and applications

The findings from the data articles point a way forward for development in Humla and other remote regions of rapid development. Development initiatives will benefit from efficacy evaluation of their health services, rather than simple quantification of the number of services provided. Villagers have very little knowledge of the new sicknesses threatening them as a result of the increased mobility and changing lifestyles associated with development, so a better

understanding of the illnesses and diseases present and emerging, rather than just the symptoms, would allow for better targeting of development programs. Additionally, more research is necessary in order to understand how other social relationships, aside from just kinship, function in villager vulnerabilities to sickness and conflict. Internal social capital may yet have a different relationship to risk than external social capital, with varying implications for development programming that aims to 'strengthen political capacity', a recent buzz-phrase and focus of time and monetary resources in development circles (Kuhl 2009). Although increased wealth and material stability may mitigate certain vulnerabilities and incentives for conflict, this dissertation has revealed that development activity is not a reliable proxy for such stability, since its measurable effects are variable and often intensify grievances in remote regions, not through their failures, necessarily, but through the unintended consequences of their successes. With this in mind, we must keep measuring in order to understand whether development initiatives are achieving their intended purposes, and what else they may be achieving.

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