GENDER AND DIET CHANGE IN THE CENTRAL HIMALAYA

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ABSTRACT

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Himalayan agricultural systems, health systems, and diet have been undergoing significant changes over the past fifty years. It has been argued that many of the changes in traditional agricultural systems have had a detrimental effect on the natural environment as well as on traditional culture and knowledge systems; and significant activism and research are taking place in the region to document and preserve traditional agricultural knowledge and apply it to current problems. However, there is limited research on diet change in the Himalayan region, though the traditional agricultural system and diet are closely related.

Through semi-structured interviews and focus groups with elder women villagers in the Rudraprayag district of Uttarakhand, India, women's experience of diet change, recollections of the traditional diet, and of factors affecting diet change were explored. The main findings are that diets have shifted from a complete reliance on traditional crop varieties and home-grown food, to an increasing dependence on store-bought food. Women view the traditional crops and foods as healthier than store-bought food, yet also have past experiences with hunger and dietary restrictions due to their gender roles. These experiences of hunger, along with changing structural conditions, may be contributing to the shift away from the traditional diet.

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1. INTRODUCTION

Though changes are always taking place in what people eat, the pace of diet change worldwide has accelerated in the last 50 years (Popkin 2006). Diet change can bring about many positive outcomes such as the alleviation of hunger, increased variety of foods, and access to needed nutrients that can make a population healthier. However, diet change can also bring about negative consequences including diet-related diseases such as diabetes and cardiovascular disease, a loss of cultural food ways and food-related knowledge, and an increased dependence on purchased or processed food, which can lead to the loss of a community's ability to either provide for themselves or to control their own food supply. As our food system becomes more industrialized, standardized, and controlled by a relatively small number of actors (McMichael 2000), arguably both positive and negative consequences are experienced by people worldwide. These consequences, then, are the impetus for a better understanding of the complexity and the tradeoffs involved in diet change.

In the Himalayan region of India, many changes have taken place over the last fifty years due to such developments as roads, schools, and markets (Kreutzmann 1991; Rawat and Sharma 1997). Many of these changes may be considered positive for mountain communities: increased access to medical clinics; primary and secondary educational institutions; increased tourism leading to possibilities for income generation; and the ability to travel and communicate more easily (Rawat and Sharma 1997). However, there are also corresponding losses as a result of these developments.

Road construction in the Himalaya has led to greater soil erosion and landslides (Rawat and Sharma 1997). Changes in what are considered traditional agricultural practices have led to increased soil erosion, loss of agricultural biodiversity, and loss of agricultural knowledge (Maikhuri, Rao, and Saxena 1996). Increased contact with tourists and increased migration to urban centers can also lead to a desire to modify cultural practices, including traditional foodways (Tripathi and Srivastava 2011). The loss of cultural practices and traditional foodways can have not only negative health impacts, but can also represent a loss of knowledge that has been generated over hundreds of years, and that has allowed communities to survive on their natural resource base (Kuhnlein and Receveur 1996; Narayanan and Kumar 2007). Though many communities may want to transform their cultural practices and diets, seeking to experience the benefits of the global, industrialized food system, these same communities may also value and rely upon their traditional diets. However, it may be difficult for Himalayan communities, for example, to maintain control of their diet in the face of a globalized food system when living in relative isolation, and when food markets begin to become the major source of food, with no options for alternatives other than to grow their own. Moreover, it is unclear as to how greatly the diets of Himalayan communities have changed in the context of so many other social, cultural, political, and ecological changes.

Though significant research has been done and continues to be carried out on the changes to the traditional agricultural systems in the Himalaya (see Maikhuri et al. 1996; Negi et al. 2009), research on changes to the traditional diet and foodways remains more limited. In these communities, the agricultural system and the food system and diet are very closely linked, as they tend to be in subsistence communities, and I would argue, in industrialized

societies. However, the exact nature of change in the Himalayan diet over the last fifty years has not been documented in detail; nor have the possible health, cultural, and political consequences related to a significant change in diet. Though some research has been done on diet change in India as a country, which has indicated that there are significant increases of diet-related disease nationwide (Misra et al. 2011), the unique context of diet change in distinct regions such as the Himalaya has not been documented in detail. Moreover, the reasons for these changes in diet, which can reveal opportunities to address negative consequences of diet change, have not been fully understood.

Furthermore, gaining an understanding of the first-hand accounts and impressions of diet change, as lived by villagers in the Himalaya, provides a detailed understanding of the actual changes in the day-to-day food habits, the experiences and views of the traditional diet, and structural factors that may be affecting changes in the diet, both negatively and positively. Elder women have been the primary cultivators and food preparers in Himalayan households (Agarwal 2002; Mukherjee 1999), and grew up eating the traditional foods. Therefore, due to their lived experience of the traditional diet and the ways it has changed and continues to evolve, elder women can be considered experts on the subject.

This study aims to answer three main research questions in regards to the changing foodways in the Himalaya:

1. How has the diet in the central Himalaya changed over the past fifty years, from the vantage point of elder women?

2. What are elder women's experiences of the traditional diet? How do they view the traditional foods?

3. How have changes in structural conditions affected the dietary changes, as experienced by elder women?

In order to gather this information, this study employed 14 semi-structured interviews and three focus groups, with a specific emphasis on gathering the insights of elder women ages 60-80, in the Rudraprayag District of the state of Uttarakhand, India. The fieldwork was carried out over the months of June and July, 2011 with the help of local guides and interpreters. During this time I had the opportunity to observe daily life when I stayed with village families while carrying out the fieldwork.

The main findings of this study show that 1) the traditional diet is slowly being replaced by food supplies purchased at the local markets; 2) women view the traditional diet to be much healthier than the foods they purchase in the markets, but they also associate the traditional diet with regular experiences of hunger and with food restrictions based on gender; and 3) several structural conditions are affecting the ability of respondents to access their traditional crops and foods – factors such as roads and food markets, decreasing crop yield, agricultural work, and climate change.

First, respondents described different aspects of the traditional diet such as greens, grains, pulses (beans and lentils), and spices, their eating habits, as well as the ways those traditional ways of eating have changed. In almost all aspects of the diet, women described a process of decreasing consumption of traditional varieties of crops and home-grown foods, and

an increasing dependence on food purchased at the local markets. For example, the women described several different types of *roti* (flat bread) they and their families used to prepare and eat on a regular basis using combinations of many different traditional grains; whereas in the present, women generally prepare *roti* using wheat purchased at the local markets (transported from the plains regions of India), and occasionally use one or two other types of traditional grains to prepare *roti.*

Secondly, women described many health benefits of the traditional foods including high energy and nutrient content and medicinal properties. Overall, respondents felt that the traditional diet was healthier, and that people in the past were stronger and fell sick less often, due in part to the diet. At the same time, women shared many experiences of hunger, of working long days with little to no food, of limited choice and variety, and of the restriction placed on their consumption of "better" foods such as rice and wheat because they were young women in their household. These experiences led to negative associations with the traditional foods, and to an increased desire to purchase foods from the market, have the freedom to choose what they would like to eat, and to eat wheat and rice more often. Thus, the experiences women have with the traditional foods directly affects the food choices they make today, which are increasingly in favor of purchased foods and away from the traditional diet.

Finally, women described some structural factors that have affected their access to their traditional foods, and which also play a role in the significant diet change the respondents are experiencing. Respondents have experienced a decrease in crop productivity in recent years due to a number of ecological and political reasons, which makes the cultivation of home-

grown foods less viable (Maikhuri et al. 2001). Women also shared experiences of the challenges of agricultural work itself, the convenience of the food markets, and climate change, all of which have affected their ability to access traditional foods, and which play a significant role in dietary change.

The results of this study indicate the rich and detailed information that individuals can provide in regards to understanding the context of diet change in a particular region. National and global trends, while critical to understand, must be supplemented with a picture of regional variation in diet change. When seeking to address the complex consequences associated with diet change, the experiences of the people undergoing the changes themselves can reveal the areas where policy and programs can be the most effective. Moreover, it is critical that gendered experiences of diet and diet change are taken into account.

In the following chapter, I begin this narrative of changes in the Himalayan diet by first reviewing the literature that defines and describes traditional diets from different areas of the world and the changes these diets have undergone; research that has documented both positive and negative consequences as a result of changes in traditional diets; reasons for these changes; and finally, literature that describes diet change in India, and of the Himalayan region.

In Chapter Three I describe the site in which I carried out my fieldwork — the state of Uttarakhand, India, and the Rudraprayag district. I then describe my research methods based on interview and focus groups, as well as my methods of analysis, in Chapter Four. Chapter Five presents the results of this study by highlighting diet change as experienced by elder women and their ties to household, community, and regional transitions. I conclude in Chapter Six by

arguing that these results demonstrate the need to understand the complexity of diet change in specific regions within the context of national or global trends; the importance of individual experiences as a rich source of information of diet change, as well as the gendered nature of diet change; and finally, recommendations for further research. Though the traditional diet in the central Himalaya provides many benefits in terms of health and ecological sustainability, and is of great importance in terms of cultural and knowledge preservation, the diet is also gendered. Women have not only been the backbone of the traditional agricultural system, they have experienced the traditional diet in unique and gendered ways. Thus, women's experiences can help to develop a future hill diet incorporating the benefits of the traditional foodways as well as the benefits of the changing diet, and also point to the importance of sharing responsibility for the agricultural and food systems in the Himalayan region.

2. LITERATURE REVIEW

Traditional agricultural and food systems that have been passed down for generations and that have developed in relationship to local ecological systems and cultures, are built on indigenous knowledge that has allowed communities to survive for hundreds, if not thousands, of years in their environments (Kumar and Pathak 2010). These two systems are closely linked as they deal with the production, processing, and consumption of food, especially in communities that mostly consume what they themselves produce (Hawkesworth et al. 2010). Moreover, traditional agricultural and food systems are becoming more important to research in the areas of agricultural development, food security and health (Frison et al. 2006) as some of the highly destructive consequences of modern systems are revealed, and as the traditional food systems begin to disappear. Research into the ways in which these traditional systems are changing, as well as the reasons for the changes, can help to address negative health and ecological consequences communities face as their food systems transition.

Kuhnlein and Receveur define a traditional food system as: "all food within a particular culture available from local natural resources and culturally accepted. It also includes the sociocultural meanings, acquisition, processing techniques, use, composition, and nutritional consequences for the people using the food" (1996: 418). Traditional agricultural systems "represent centuries of accumulated experience of interaction with the environment by farmers without access to scientific information, external inputs, capital, credit, and developed markets" and are characterized by a high degree of plant diversity and cropping systems which

promote a diverse diet; decreased insect and disease incidence; and efficient use of local resources (Altieri and Merrick 1987: 88). As environmental degradation and diet-related diseases increase in relationship to the rise in industrial food and agricultural systems, traditional systems can provide vital information and techniques as a corrective. In their work linking agricultural biodiversity to nutrition and health, Frison et al. call for the "reintroduction" of traditional and indigenous food systems as resources to help with modern diet-related diseases, malnutrition and "eroding agricultural diversity," particularly in the developing world (2006: 176). Moreover, understanding the ways in which traditional food systems are changing, and the reasons for those changes is crucial in addressing the negative consequences many communities, households, and individuals experience as they encounter the byproducts of industrial food systems.

Traditional food systems are characterized by a high level of diversity – in the types of plants used, both species and genetic diversity; the sources of animal protein; the methods of acquiring food, often a mixture of hunting, gathering, cultivating, and fishing; and the methods of processing food (Fleuret and Fleuret 1980; Kuhnlein and Receveur 1996). The results of this study show that traditional food systems also include diverse consumption practices, in particular, gendered consumption patterns. This gendered experience, in the case of this study's participants, includes restrictions on women's consumption patterns, and is an important factor in women's participation in moving away from the traditional diet. Therefore, traditional food systems are not entirely positive for all members of the community. This topic will be taken up at greater length in the Results and Discussion section.

Traditional food systems also include staple foods such as starches and grains, small game, and plants. These plants are either cultivated, gathered from the wild, or gathered from areas that have been cleared and include mushrooms, leafy greens, fruits and roots (Fleuret and Fleuret 1980). Moreover, many of these foods are very high in nutrient content, such as the high mineral and vitamin content found in traditional African leafy greens (Mnzava et al. 1999). The systems are also based on acquisition and cultivation practices that in many cases have allowed populations to sustain themselves in the same environment for hundreds of years (Kuhnlein and Receveur 1996).

For example, tribal communities living in the state of Sikkim, India in the Eastern Himalaya gather up to 190 wild edible species of plants as part of their regular diet, while continuing to cultivate their traditional grains (Sundriyal and Sundriyal 2001). These wild plants are gathered when they are seasonally available, a practice that has allowed these communities to survive in this region for thousands of years while maintaining an incredibly rich natural biodiversity in the local ecosystems. The wild edible plants also contain high levels of fiber, vitamin C, and iron (Sundriyal and Sundriyal 2001).

Another example of a traditional food system in a very different environment is that of the Inuit, from the Arctic region of Canada. Their traditional food system is based on animal meat and fat as those are the only sources of food regularly found in their environment. Though a diet based mostly on meat seems as though it is not diverse, the Inuit eat many different types of meat. The types of animals they eat include seals, whale, caribou, and fish; and to a lesser extent arctic hare, ptarmigan, polar bear and a large variety of other birds, mammals and fish (Boult 2006). Berries and herbs are also an important part of the diet when

available. In addition, food sharing is an important part of their culture, such as the sharing of seal meat with other families. This practice is followed not only to maintain positive social relations between families, but is part of a belief system and a set of practices that directly aim to maintain healthy populations of seal and other hunted animals (Borré 1991). Though traditional food systems have been acknowledged as important sources of human nutrition by international bodies such as the International Conference on Nutrition (1992) (Frison et al. 2006), and are based on practices that in many cases have allowed communities to sustain themselves on the same natural resource base for hundreds of years, these systems continue to change and adapt as indigenous communities come into contact with industrial agricultural and food systems. Many times the changes result in the loss of vital knowledge, as well as negative environmental and health consequences.

As many countries develop, and as indigenous populations globally become further and further removed from their traditional practices, their populations are shifting from their traditional agricultural and food systems based on a local resource base, to industrial systems based on a global resource base (Damman, Eide, and Kuhnlein 2008; Popkin 2001). Though there are many positive attributes associated with the industrial food system such as convenience, taste, and high productivity, it is important to understand the many negative consequences that result from a shift away from traditional food systems. Such an understanding can help communities in the midst of transition, do so more healthfully. Diet change is leading to such consequences as increases in sugar and edible oil consumption, which is linked to health problems, such as increasing rates of diabetes, obesity, and other diet-related diseases (Kearney 2010); increasingly degraded environments, due to the introduction

of high-input industrialized agricultural systems (Shiva 1991); significant loss of cultural practices and knowledge systems (Kuhnlein and Receveur 1996); and loss of food sovereignty (Pionetti 2006).

Health problems that have resulted in communities as a result of a shift away from the traditional diet include diabetes, obesity, and other diet-related diseases, what is being called the "nutrition transition" (Popkin 2006). This transition is also linked to the "double-burden" of diet-related diseases in developing countries that simultaneously struggle to provide for the basic needs of their populations (Popkin 2001). Countries such as Brazil, China, India and Mexico, which are rapidly industrializing, are struggling with this double-burden (Kearney 2010).

Scholarship on the "nutrition transition" has mostly focused on national-level trends in diet change, and has mostly emphasized health as a negative consequence of these changes. For example, important information on obesity levels for high-income as well as developing countries has been gathered, such as the increasing percentage of overweight and obese men and women in both rural and urban settings in countries such as China, Brazil, Mexico, and the US. This information has been compiled and compared and linked to diet change and lifestyle shifts (Martorell 2002; Popkin 2006). Increasing rates of diabetes worldwide, from 30 million people in 1985 to 135 million people in 1995, have been linked to increased consumption of sugar, increased body fat, and decreased physical activity associated with an increasingly urbanized global population (O'Dea and Piers 2002). These trends are related to greater access to processed and packaged foods high in salt, sugar, and fat, as well as decreased levels of physical activity as urban populations tend to move less (Popkin 2002). This national and global

level information is critical for understanding trends that are taking place worldwide and that are affecting millions of people, in a world that is only becoming increasingly urbanized. However, this scholarship can be enhanced by research that provides information on the serious impacts (aside from health) on culture, sovereignty, knowledge systems, and ecological systems that are also related to diet change, the variations that take place regionally, the perspectives and experiences at the community or individual level, and different experiences due to gender or other demographic variables.

Kuhnlein and Receveur (1996) cite numerous cases of significant change to the traditional diets of diverse communities such as the !Kung Bushmen of the Kalahari Desert; the Nuxalk, an indigenous community in British Columbia; and the Hopi of the Southwest United States. These communities were not only found to have significant health problems associated with diet change, but to have also consistently lost traditional food practices and knowledge, and experienced environmental degradation in conjunction with a shifting diet. For example, the !Kung Bushmen of the Kalahari Desert in Botswana survived for many generations with their traditional diet based on local resources and diverse sources of animal protein, wild-gathered plants, and nuts, and experienced very few diet-related diseases. However, their diet began to shift starting in the 1960's to being fully dependent on purchased supplies of maize. By the 1980's researchers began to see high rates of anemia, parasitism and liver damage, in part due to the significant diet change, a change which had resulted in a greater dependence on store-bought foods (Kuhnlein and Receveur 1996). This information illustrates the loss of diversity in the diet, as well as the loss of food sovereignty for a community that mostly provided for itself, but became dependent on purchased food supplies. This level of complexity

and detail of the local context of diet change would not have been available from a national-level survey of trends in diet change.

One example of research which has illustrated the loss of cultural practices related to a changing diet is in the Inuit communities of the Arctic. Inuit communities of the Arctic region live a lifestyle very different than that of the average Canadian. However, over time, their cultural practices have been undergoing significant transition. Borré, an anthropologist who studied the place of seal meat in the Inuit diet, found out "how deeply connected the community's preference for seal meat was to their notions of health, physiology, and cultural identity" (1991: 50). Seal meat is not simply a food, but is deeply tied in with the community's cultural identity. The sharing of seal meat has traditionally been an important cultural practice that brings families together, and serves as an ecological strategy to maintain seal populations. However, the Inuit have slowly been losing cultural practices related to food, such as the sharing of seal meat. Factors that have contributed to the loss of this cultural practice include the public education system which takes youth away from their homes and does not give time for families to pass on hunting and meat preparation; the increasing presence of shops to purchase food supplies; and federal policies that have restricted Inuit hunting practices (Borré 1991).

One area of changing food systems in which the loss of knowledge is palpable is in the declining practice of seed saving. Seed selection and storage requires an incredible amount of knowledge about varietal differences, crop diseases, nutrition, and food preparation (Pionetti 2006). Women farmers in the drylands of South India hold a tremendous amount of knowledge in terms of the types of seeds they save and the reasons for saving them; when and where to

plant specific varieties; the nutritional value of different crops; and the qualities that make certain varieties better for food preparation than others, such as taste and cook time (Pionetti 2006). However, as agricultural systems and rural diets in India change, the reliance on saved seed and subsistence crops becomes replaced with purchased inputs for commercial crops and store-bought food supplies (Finnis 2007). Thus, the detailed and specific knowledge on how to save seeds of diverse subsistence crops may get lost when communities no longer rely on those crops for food.

Moreover, the ownership of seeds and the means of food production is an integral part of food sovereignty. One definition of food sovereignty developed by the organization *La Via Campesina* is:

> The right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of market and corporations… (as cited in Patel 2009: 666)

If people must depend on commercially available inputs in order to grow food, purchased supplies in order to eat, and transportation systems in order to access basic needs, communities face the possibility of a loss of food sovereignty. If people are unable to easily access culturally appropriate foods or healthy foods, either because of policy or cultural practice that has removed people from their own land, as in the case with many indigenous communities in the US (Damman et al. 2008), or because healthy foods are too expensive, then food sovereignty is threatened. Considerations of the health impacts of diet change are important, but are not separate from or more important than other possible consequences such as a loss of food sovereignty, loss of cultural practices, and loss of knowledge.

Finally, diet change is also gendered, in that women and men often have different diets, and experience diet change in distinct ways (Hansford 2010). Though scholarship on the nutrition transition has acknowledged gender, the perspective in the literature on how gender is related to diet change seems limited to the ways in which women's rates of obesity are different than men's, and how women's employment outside of the home causes families' diets to become less healthy: "Particularly important in the nutrition transition are associated changes in the roles of women (especially with respect to patterns of time allocation), in income distribution, and in household food-preparation technology" (Popkin 1993: 143). However, Hansford, in her study in Brazil, found that a gendered perspective on diet change and the nutrition transition yields deeper considerations such as, access to different kinds of food due to household dynamics, differences in physical activity and ability to leave the home, and biological differences in the storage of body fat (2010). Hansford found that in urban settings women may be less physically active than men due to their gendered household roles and limitations on women's movement outside the home, and that women may reserve healthier foods for male family members, negatively impacting women's health more than men's as communities transition to the urbanized lifestyle and diet (2010).

The human diet has clearly undergone tremendous change throughout history, and in fact many changes are considered critical for our evolution as a species (Gordon 1987). Historically these transitions have been slow, taking place over very long periods of time, such as the domestication and breeding of wild plant species and the incorporation of these varieties into the diet over time where the plant was originally domesticated (Katz 1987). However, the

pace of dietary change has increased over the last three hundred years globally, with important health, environmental, and cultural consequences (Popkin 2006).

For example Mead et al. (2010), in their study of changes in food practices and diet of the Inuit in Nunavut, Canada, found that it was necessary to investigate diet change and the reasons for those changes in order to more effectively address the increasing prevalence of chronic disease. Changes in educational systems, transportation, personal preferences, and access to shops were found to have a tremendous impact on the Inuit diet; this in turn has had an impact on the community's health, namely increased nutritional deficiencies and levels of diet-related chronic disease (Mead et al. 2010). The researchers found that in order to develop more effective health-related interventions, an understanding of the ways in which the traditional diet has changed, and the reasons for those changes, were critical. For example, researchers identified the increasing importance of store-bought food in Inuit communities, yet also identified cost as a barrier for communities to access healthy food. Thus, increasing access to healthy foods at local shops would greatly improve the health of Inuit communities who are increasingly relying on store-bought food (Mead et al. 2010).

A useful framework for understanding diet change is the "Characteristics of the five patterns of the nutrition transition" that Popkin develops in his work (Popkin 1993; Popkin 2006). Though Popkin's emphasis in understanding diet change is on developing a national-level, and even global, picture of diet change with the goal of addressing the health impacts, he acknowledges that the nutrition transition is a

> complex interplay of changes in patterns of agricultural, health, and socioeconomic factors…One needs to be concerned with food supply, which relates to agricultural systems…economic resources, demographics, various cultural and knowledge factors

> associated with food choice, and also disease patterns, sociological considerations such as the role of women and family structure (Popkin 2002: 111-112).

Thus, his theory of the five patterns of diet change can also be useful in a study such as this which identifies the importance of addressing not only health concerns, but also the impacts on knowledge, culture, sovereignty, and environmental degradation.

Popkin has categorized five patterns of diet change based on a study of changes in diet in different regions of the world (see Table 2.1). Popkin's theory on the five patterns of diet change describes the nutritional status, economy, demographics, and food processing technology of different societies. Pattern one, "collecting food," describes hunter-gatherer societies. These societies maintain a plant-based diet (with lean meat from hunted animals as well), they experience few nutritional deficiencies, but high rates of infectious disease, yet they have minimal to no food processing technologies.

Pattern two, "famine," describes a society that relies more on agriculture and animal husbandry; cereals are the dominant food and the diet is less varied than hunter-gatherers; famine and starvation are common; epidemics and nutritional deficiencies exist; and the population is mostly rural. Pattern three, "receding famine," describes a society that has begun to have greater access to fruits and vegetables and animal protein, and relies less on starches and staples; agricultural inputs such as fertilizer are used and agricultural practices are more industrialized; women have joined the labor force; famine is less common but infectious diseases are prevalent; and populations become more urbanized. Pattern four, "degenerative disease," describes a society in which animal fat, sugar, and processed foods are regular parts of the diet; obesity and diet-related diseases are common; populations are more urbanized and sedentary; and agriculture and food processing are highly industrialized.

Table 2.1 Characteristics of the five patterns of the nutrition transition (Popkin 2006: 290)

	Pattern 1: collecting food	Pattern 2: famine	Pattern 3: receding famine	Pattern 4: degenerative disease	Pattern 5: behavioral change
Nutrition profile					
Diet	Plants, low-fat wild animals, varied diet	Cereals predominant, diet less varied	Fewer starchy staples; more fruit, vegetables, animal protein; low variety continues	More fat (especially from animal products), sugar, processed foods; less fiber	Higher-quality fats, reduced refined carbohydrates, more whole grains, fruit, vegetables
Nutritional status	Robust, lean population; few nutritional deficiencies	Children and women suffer most from low fat intake, nutritional deficiency diseases emerge, stature declines	Continued mother/child nutrition problems, many deficiencies disappear, weaning diseases emerge, stature grows	Obesity, problems for elderly (bone health, etc), many disabling conditions	Reduction in body fat and obesity, improvement in bone health
Economy					
Jobs	Hunter-gatherers	Agriculture, animal husbandry, homemaking begin; shift to monoculture	Second agricultural revolution (crop rotation, fertilizer), Industrial Revolution, women join labor force	Fewer jobs with heavy physical activity, service sector and mechanization household technology revolution	Service sector mechanization and industrial robotization dominate, increase in leisure exercise offsets sedentary jobs

Table 2.1 (cont'd)

Household production	Primitive, onset of fire	Labor-intensive, primitive technology begins	Primitive water systems, clay stoves, cooking technology advances	Household technology mechanizes and proliferates	Significant reduction in food preparation costs
Income and assets	Subsistence, primitive stone tools	Subsistence, few tools	Increases in income disparity and agricultural tools industrialization	Rapid growth in income and income disparities, technology proliferation	Decrease in income growth, increase in home and leisure technologies
Demographic profile					
Mortality and fertility	Low fertility, high mortality, low life expectancy	Age of Malthus; high natural fertility, short life expectancy, high infant and maternal mortality	Mortality declines slowly, then rapidly; fertility static, then declines; small, cumulative population growth, which later explodes	Life expectancy hits unique levels (ages 60–70), huge decline and fluctuations in fertility (eg, postwar baby boom)	Life expectancy extends to ages 70 and 80 yrs, disability-free period increases

Table 2.1 (cont'd)

Morbidity	Much infectious disease, no epidemics	Epidemics, endemic disease (plague, smallpox, polio, tuberculosis), deficiency disease begins, starving common	Tuberculosis, smallpox infection, parasitic disease, polio, weaning disease (diarrhea, retarded growth) expand, later decline	Chronic disease related to diet and pollution (heart disease, cancer), decline in infectious disease	Increases in health promotion (preventive and therapeutic), rapid decline in cardiovascular disease, slower change in age-specific cancer profile
Age structure	Young population	Young, very few elderly	Chiefly young, shift to older population begins	Rapid decline in fertility, rapid increase in proportion of elderly person	Increases in the proportion of elderly _75 y of age
Residency patterns	Rural, low density	Rural, a few small, crowded cities	Chiefly rural, move to cities increases, international migration begins, megacities develop	Dispersal of urban population decrease in rural green space	Lower-density cities rejuvenate, increase in urbanization of rural areas encircling cities
Food processing					
Techniques and Technologies	Nonexistent	Food storage begins	Storage processes (drying, salting) begin, canning and processing technologies emerge,	Numerous food transforming technologies	Technologies create foods and food constituent substitutes (eg, macronutrients)

Table 2.1 Characteristics of the five patterns of the nutrition transition (Popkin 2006: 290)

Finally, pattern five, “behavioral change,” describes a society that has, through education and policy, reduced fat and sugar intake; reduced rates of diet-related disease; increased physical activity during leisure time, because work is mechanized; and remains highly urbanized (Popkin 1993; Popkin 2002; Popkin 2006).

The patterns are not necessarily meant to describe a linear progression that every nation or population goes through or will go through, but can help to compare societies, and can also help to understand the links between factors such as the health, economy, and diet of a population. The patterns can also serve to predict what types of health issues a population might face if other aspects of their society are changing in ways that others have before. Thus, these patterns show that developing countries such as India appear to share some technological and economic transitions, and changes in terms of food processing, with the US and other industrialized nations, and therefore may experience similar diet-related diseases. Understanding the patterns a priori could direct policy and development initiatives to prevent the types of diet-related diseases many of the industrialized nations now suffer (Popkin 1993; Popkin 2002; Popkin 2006). At the same time, these patterns must be used cautiously so as to not assume that all countries will proceed along a similar linear path, that India’s experiences are similar to countries such as the US, or that the interventions used in the US can and should be applied to countries such as India. Caution is even more important in situations where proceeds from such interventions economically benefit colonizer nations.

One of the important aspects of pattern five in Popkin’s conception is that along with behavior changes in regards to eating habits and physical activity that individuals themselves undertake, governments are taking action to educate the public, working with the food

industry, and creating policy intended to increase health consciousness, as well as access to a healthier diet. This focus on institutions as agents of intervention corresponds with his focus on gathering data in the form of national trends. Though an understanding of national trends and the contribution to federal health policy or development initiatives is critical, it is limited in that it does not take regional variation, or the possibility for community-level response or individual agency into account.

According to this framework, developing countries experiencing the nutrition transition such as India, China, and Brazil seem to be moving from pattern three to pattern four. For example, as India becomes increasingly urbanized, the diet includes more fruit and vegetable consumption as indicated in pattern three (Verma, Datta, and Mandal 2007), but is moving towards greater consumption of fats and sugar as indicated in pattern four (Misra et al. 2011). Agriculture has become highly industrialized (Kataki 2002), as indicated in pattern three, but the population is now becoming more urbanized with fewer physical jobs (Misra et al. 2011), as indicated in pattern four. As the patterns also indicate, in the transition from pattern three to four, India's population is indeed experiencing greater rates of diet-related disease (Misra et al. 2011). Thus, there is cause for concern as India undergoes a nutrition transition.

At the same time, it would be difficult to generalize every region or community in a country, and it is highly likely that within the same country different communities would be experiencing different patterns. Different regions of India have distinct geographies, economies, languages, cultures, and foodways (Achaya 1994), so it is highly likely that the diverse regions will experience diet change differently. Moreover, identifying a pattern is not sufficient for addressing the complexity and tradeoffs involved in diet change. One must also

understand the factors that are affecting those changes and how they vary across space and time, in order to avoid policy or development initiatives that seek to address a problem with a solution designed for another context.

Factors that affect diet change have been described in the literature in a wide range of populations such as indigenous communities, urban middle-class American communities, and rural poor in developing countries (Caplan 2002; Mead et al. 2010; Popkin 2006). These factors could either be personal, such as preferences and perceptions, or structural, in terms of policy or changes in global markets. Structural conditions that affect diet change include technological shifts in agricultural and food sectors (Popkin 2006); changes in household income or in the global marketplace (Kearney 2010); greater access to food shops or markets (Damman et al. 2008); political reasons such as the removal of indigenous communities from ancestral land (Damman et al. 2008); increased access to media and advertising such as television (Popkin 2006); and environmental degradation (Kuhnlein and Receveur 1996). These conditions affect communities in distinct and specific ways, highlighting the need to understand the "micro-level" of dietary change, as broader global and national data do not necessarily reflect regional variation (Finnis 2007). Such context-specific research, allowing for an understanding of a particular region, as well as an understanding of the experiences of subsets of the population such as women, is difficult to access through data reflecting global or national trends in consumption patterns.

For example, the study of national trends of diet shift in India does not reflect the great regional variation in the consumption of coarse cereals (Kumar and Mruthyunjaya 2007), nor does statistical data allow for a qualitative understanding of the "the physical factors that

farmers perceive as affecting crop productivity and viability" and the "the priorities, preferences, and aspirations" of people themselves (Finnis 2007: 343). Finnis, in her study of diet change in the Kolli Hills in South India, found that local communities were moving away from traditional food systems, with corresponding negative health consequences. She emphasized the importance of understanding the reasons for these changes, from broad-scale economic changes, to household decision making, to personal preferences and food choices. Finnis found that the shift in diet away from local millets was related not only to changes in production systems towards commodity production of cassava, but also related to the lack of access to millet in the local markets, and the difficulty of purchasing a diverse selection of food supplies when families had to haul them up steep mountainous paths (2007). Through direct conversations with individual villagers, Finnis was able to gather these lived experiences to paint a much more nuanced portrait of the complexity of diet change. Thus, a context-specific understanding of dietary change, the ways in which a diet changes, as well as the personal and structural factors that affect those changes, is critical for being able to understand the transition of specific communities and inform local solutions. In this next section, I review literature pertaining to agricultural and food system change in India and the Himalayan region.

India and the Central Himalaya

India

The incredible regional variation of traditional agricultural and food systems in India, having developed over centuries and supported human survival in a vast diversity of

geographical and climatic conditions, is also increasingly being replaced with more industrial foodways. India is currently undergoing a "nutrition transition" — a major shift in diet away from traditional food systems to industrial ones; and the "double-burden" of increasing rates of diet-related diseases while millions still experience high rates of hunger and malnutrition (Misra et al. 2011). For example, the prevalence of overweight/obesity in Indian urban adults has increased from 13.3% to 37.8% (for males) and 15.6% to 50.3% (for females) from 2001 to 2007; and rates of Type II Diabetes have increased from 4.6% in 2001 to 7.3% in 2008 (Misra et al. 2011). At the same time, over 20% of urban women and 50% of rural women are considered underweight (Popkin 2006).

India is also experiencing severe levels of environmental degradation such as soil erosion, water and air pollution, and the loss of biodiversity related to changes in the shift from traditional agricultural systems to industrial ones (Shiva 1993). For example, topsoil in 60% of the geographical area of Haryana, one of the states in which agricultural practices were most intensified using Green Revolution technologies, is now considered to be degraded due to water-logging, salinity, and alkalinity (Singh 2000). The technological changes brought about by the Green Revolution (which began in the 1960's) led to a shift in agricultural systems from localized diverse systems to monocultures of rice and wheat, also known as the rice-wheat cropping system (RWCS) (Kataki 2002). The amount of land cultivated in the RWCS has increased to an estimated 12 million hectares (Kataki 2002), displacing the production of pulses, oilseeds, and local vegetables. Not only did the agricultural systems change from diverse traditional systems to the RWCS, the Indian diet shifted from diverse traditional systems to a heavy reliance on wheat and rice consumption (Kataki 2002).

Furthermore, the accompanying chemical package required to grow the high-yielding rice and wheat includes chemical fertilizers and pesticides. Years of fertilizer and pesticide use and intensive cultivation practices have led to soil erosion, water contamination, and loss of insect biodiversity among many other environmental problems (Kansal, Dhaliwal, and Bajwa 1996; Shiva 1991). Heavy reliance on irrigation has led to declining aquifers and soil salination (Kansal et al. 1996). Pesticide use has also led to kidney disease, increases in cancer rates, and a whole host of issues in human health (Abhilash and Singh 2009). In light of these ecological and health consequences of industrialized agriculture, the traditional agricultural and food systems of India are increasingly being recognized as potentially important resources in addressing the negative consequences wrought by reliance on the RWCS (Maikhuri et al. 1999).

Traditional agricultural and food systems in India include a high genetic diversity as well as a high diversity of different foods such as pearl millet, barley, sorghum, maize, whole wheat; pulses, local fruits and vegetables; and a wide variety of spices (Misra et al. 2011). Kataki (2002) found that traditionally throughout India there were at least 30 different cropping systems much more prevalent before the Green Revolution, such as rice-rice, rice-pulse, and cereal-oil seed, which provided diverse diets. He also found that in regions of India that continue to consume their traditional diverse diet such as Mizoram and Meghalaya in the Northeast, there are lower levels of childhood stunting (deficiency in height for age); while areas that have shifted to monoculture RWCS experienced a related increase in childhood stunting and child malnutrition. Interestingly, as India becomes increasingly urbanized, diets are shifting towards higher levels of sugar, oils, processed and packaged foods (Caplan 2002), while at the same time, greater amounts of fruits and vegetables (Verma et al. 2007). This shift

in diet is certainly positive in some aspects, such as increased fruit and vegetable consumption and less hunger. However, increased consumption of fats and sugar, coupled with decreasing levels of physical activity in urban areas, is leading to the "double-burden" – the increase in diet-related diseases in certain sectors of the population while large percentages of the population remain hungry (Misra et al. 2011). Misra et al., who cite "globalization" as a driving force of change in Indian agricultural and food systems, point to "the severing of the link between diets and local availability of resources and local habits" (2011: 280). They connect the shift from the traditional diet towards the "globalized" diet to increased rates of such conditions as diabetes and obesity in an increasingly urbanizing and globalized India (2011).

Diet change and diet-related diseases are not only affecting the increasingly urbanized populations of India with greater access to the modern globalized diet, but these diet changes are reaching rural areas (Tripathi and Srivastava 2011). Though there still exists great heterogeneity in the Indian diet, this heterogeneity is decreasing due to interstate migration, as well as the return of migrants to their original homes, bringing the desire for the urban diet and foodstuffs with them (Tripathi and Srivastava 2011). However, national trends of agricultural and diet change in India do not necessarily reflect regional variation (Kumar and Mruthyunjaya 2007). Therefore, it becomes increasingly important to understand the context of specific health and ecological issues in a given region.

The Central Himalaya

In India, the Himalayan region is unique geographically and culturally. The distinct Himalayan cultures have developed, in part, due to the topography which has caused mountain communities to be historically more isolated than the plains areas to the south (Joshi and Singh 2010). However, due to the construction of paved roads beginning in the 1960's throughout the Himalayan region (Kreutzmann 1991), and the introduction of media such as television, mountain areas are more connected to mainstream Indian society and the global society than ever before (Joshi and Singh 2010). Moreover, cultural exchange is taking place, as the Indian Himalaya are an important tourist destination for Indian and international travelers alike; and as mountain people migrate to the plains and other urban centers in search of employment, returning to their mountain villages bringing new cultures home (Joshi and Singh 2010).

In the context of broader cultural changes, traditional Himalayan agricultural and food systems are transforming rapidly. Such changes bring both negative and positive consequences to mountain communities. However, there is much evidence that traditional agricultural and food systems are eroding, with some negative ecological and health consequences for local communities (Nautiyal and Kaechele 2007; Negi et al. 2009; Subeti 2010). For example, as monoculture apple production increases, terraces that were previously used for a wide diversity of traditional crops to be consumed locally are converted to commercial apple production. The apple varieties produced are less diverse, dependent on chemical inputs, and developed for export markets. This causes local people to be more dependent on purchased food supplies (Negi et al. 2009). Negi et al. found that in apple producing areas, there was a

decrease in the planting of traditional trees which had a variety of uses from fodder for cattle to food and fuel wood, which, in turn, placed greater pressure on forest resources (2009).

The Himalaya are known for a high biological diversity of "underexploited" crops (Maikhuri, Nautiyal, and Khali 1991) as well as wild plants (Sundriyal and Sundriyal 2001). Food plants include a wide array of traditional varieties of millets, barley, rice, sorghum, and wheat (Maikhuri et al. 1999), and a tremendous variety of wild greens and fruits (Sundriyal and Sundriyal 2001). Diversity also extends to the cropping systems themselves (Negi et al. 2009), including a well-known traditional cropping system called *baranaja* — the sowing of twelve different crops together at the same time (Sati 2005b). Ninety percent of the cultivated areas in the central Himalaya have traditionally been devoted to subsistence crops grown for domestic market or local consumption, and cultivation has been closely linked with other subsistence activities which "form an integrated production system for sustainable livelihoods" (Negi et al. 2009: 313), demonstrating the direct relationship between the traditional agricultural systems and diet. Traditional Himalayan farming systems, and therefore food systems, are highly diverse, dependent on local resources and knowledge bases, and locally developed technologies (Negi et al. 2009). Moreover, many of the traditional foods and crops are highly nutritious and are also used for medicinal purposes (Dangwal et al. 2007; Maikhuri et al. 1991). However, research over the last 20 years has consistently documented a decline in traditional agricultural practices and systems; and a loss of traditional agricultural knowledge and crop diversity (Maikhuri et al. 1996; Maikhuri et al. 1999; Nautiyal and Kaechele 2007; Saxena, Maikhuri, and Rao 2005). From 1970 to 1990 the percentage of area under cultivation of several important traditional crops declined from 60-80% due to changes in cropping

systems, environmental degradation, migration, and cultural shifts (Maikhuri et al. 1991). Though this research points to critical issues in agricultural systems change, research on food systems change in the Himalaya is limited. Furthering this research will allow agricultural development and policy initiatives to take into account the specific context of food systems change, and to be more effective in affecting the food practices of mountain communities.

Furthermore, research on agricultural and food systems change in the Himalaya requires a gendered perspective. Traditional farming systems in the Himalaya rely primarily on women's labor (Agarwal 2002). Though men are responsible for building the terrace walls and plowing the fields, women perform all other tasks including sowing seeds, pulling weeds, pest control, adding manure, harvesting, and preparing food (Mukherjee 1999; Agarwal 2002). This trend has only increased, especially in lower and middle elevations, due to high male outmigration in search of employment in urban centers (Mukherjee 1999). Women not only cultivate the traditional crops and prepare the food, but also hold a tremendous amount of ecological and agricultural knowledge, gained through their day-to-day tasks, and passed down from generation to generation (Agarwal 2002; Howard 2003; Shiva 1993). Women also experience environmental degradation in different ways than men due to their gendered work roles (Agarwal 1992), and experience diet change differently than men (Hansford 2010). Thus, studying diet change in the Himalaya must include a gendered perspective in order to account for the different ways that men and women experience agricultural and food systems change.

As Caplan (2002), Finnis (2007), and Hansford (2010) found, speaking directly with individuals undergoing change can reveal important information about diet change, and the personal and structural factors affecting the changes. Individual experiences can provide rich

and detailed information about the specific ways in which the diet is changing, such as the types of foods eaten each day; the reasons individuals choose to eat the way they do; the consequences of diet change; and the constraints, either at a household or systemic level that prevent people from consuming their preferred diet. For example, Caplan (2002) spoke with middle-class women in Madras in 1970 and then again in 1990 about their families' diet as well as the changes in the food system that the women experienced. The women revealed that important factors such as television commercials, the convenience of store-bought food, the increase in the presence of restaurants, and the use of electrical appliances, greatly affected a shift towards a diet higher in salt, sugar, and fat, and away from the traditional south Indian foods the women had been preparing previously.

The rapid change in traditional agricultural systems in the hills could indicate a corresponding diet change, since the hill communities have historically depended on their own food system for survival. However, much of the research on the changes in agricultural systems in the Himalaya has focused on changes to crop varieties, cropping systems, and changes to land use, and not on the changes in consumption patterns of hill people or the complex, context-specific reasons for those changes. Given the documented health benefits of many of the traditional Himalayan crops, and the current situation of increasing diet-related diseases in India related to the industrial diet, it is important to understand the ways in which the diet of hill communities is changing, the reasons for the changes, and negative consequences of the changes. This approach is also in keeping with research on understanding agriculture and food as a system, and not as discreet sectors, where changes to one part of the system likely indicate changes in other parts (Wright 1999). Moreover, the actual experiences of individuals,

particularly the elder generation, are important to understand since the elders carry experiential knowledge of the traditional foodways. Elder women in the central Himalaya are to be considered particularly knowledgeable since they consumed the traditional diet exclusively until recently, and they have been primarily responsible for agricultural and food preparation tasks in hill communities. This research can contribute directly to policy, development initiatives, and educational programs aiming to benefit the health and sustainability of mountain peoples in the central Himalaya.

3. SITE DESCRIPTION:
Rudraprayag District, Uttarakhand, India

The state of Uttarakhand lies in the northern part of India and borders the Indian states of Himachal Pradesh and Uttar Pradesh, as well as Nepal and Tibet (See Figure 3.1). Uttarakhand (also referred to as Uttaranchal) was formed in 2000 as the 27th state of India, and is comprised of 13 districts (Sati 2005a). Though there are some sloping plains, the vast majority (90%) of the state is hilly to mountainous (see Figure 3.2), with lower altitudes starting at 2,000 feet, all the way to high snow-covered peaks, some with altitudes greater than 20,000 feet. Over 60% of the land is covered in forest, and the terrain is rugged and rocky (Maikhuri et al. 2009; Sati 2005a). The weather is relatively unpredictable as in many mountainous regions, and different weather conditions can occur within short ranges of time in a given area, being stormy and windy at one moment, and breaking into clear sunshine in the next. Different weather conditions can also be experienced in two nearby places at the same time because of geographical and topographical differences (Capila 2002). Two of India's most important rivers both for water and for their sacredness, the Ganga and the Yamuna, start in the glaciers of Uttarakhand (Maikhuri et al. 2009).

Figure 3.1. Map of India. The state of Uttarakhand borders Nepal and Tibet as well as the Indian states of Himachal Pradesh, Uttar Pradesh, and Haryana. (For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis).

The state is also home to some of the country's most sacred religious pilgrimage sites including Kedarnath (considered one of the holiest Hindu temples), as well as forest preserves such as the Jim Corbett National Park, heavily visited during the summer travel months by both Indian and international travelers. Much of the landscape is associated with Hindu mythology and there are many sacred sites such as temples. Many residents consider the mountains, forests, streams, and other aspects of the land to be sacred as well (Capila 2002).

Uttarakhand, as much of the Himalayan region, is home to an incredible diversity of plant and animal species, microclimates, crops and cropping systems, terrain, and human cultures (Saxena et al. 2005). The state is still rural, with a population of 6.0 million (density of 94.4 persons per square kilometer), and agriculture is the main occupation in the region, with 75% of the population engaged in agricultural work (Sati 2005b). The traditional agricultural system is characterized by mixed planting systems; rich crop biodiversity; reliance on human hand labor, primarily women's labor due to high male outmigration; terraced fields (see Figure 3.3); reliance on cattle and other livestock for manure and labor; low chemical input and relatively low productivity; and is primarily rain-fed (Chandra et al. 2011). This system is in stark contrast to plains regions such as Punjab and Haryana where the RWCS is the norm and agriculture is highly mechanized (Kataki 2002). The high agricultural biodiversity characteristic of traditional agricultural systems in Uttarakhand is related to the diversity of climates, soils and wild biodiversity found in the region, but is also maintained and enhanced by cultural beliefs and practices, such as festivals and traditional food preparations. Thus, agricultural systems and cultural practices are very closely related in Uttarakhand (Nautiyal et al. 2008).

Figure 3.2. The middle hills in Rudraprayag District - rugged terrain, agricultural terraces, sparsely laid out houses and villages, and a few roads.

Figure 3.3. Terraced agricultural fields on a steep hillside. All crops in the hills are grown on terraces such as these, some steeper than others. Note the neat terraces, all shaped by hand and supported by hand-built stone walls.

The main seasons in the hills are winter (October – February), spring/summer (April – June), and rainy season (July-September), Monsoon rains play a critical role in this rain-fed system, more than half of which falls during the months of July and August, thus, the majority of planting in the warmer months begins in June (Nautiyal and Kaechele 2007). *Rabi,* or rainy season, crops include wheat, barley, mustard, lentils, and peas; and *kharif*, or dry season, crops include rice, millet, and maize (Maikhuri et al. 2001). The traditional agricultural system has historically relied upon a wide variety of traditional crops and their varieties such as millet, amaranth, rice, kidney beans, and lentils. However, recent research has shown that not only is crop diversity declining, but soil erosion and other ecological degradation has been linked to newer, more intensive agricultural practices (e.g. monoculture and chemical inputs) (Maikhuri et al. 2001; Nautiyal and Kaechele 2007; Negi et al. 2009; Saxena et al. 2005).

Though subsistence agriculture is the main occupation of the people, and though the state is very rich in biodiversity and natural resources and maintains a GDP higher than the national average, in 2001 70% of the land holdings were considered marginal in size, and 36% of families were considered to be living below the poverty line (Maikhuri et al. 2009). Part of the reason for the continued poverty of a relatively high percentage of the population is due to the difficulty of developing industry in the rugged terrain (Sati 2005a). Currently, the only relatively well-developed source of income in the hills is tourism-related work (Rasmussen and Parvez 2002).

The state of Uttarakhand is culturally divided into two main regions, Garhwal and Kumaon. Garhwal, where this study was conducted, is the region covering the western half of the state including the Rudraprayag, (Pauri) Garhwal, Tehri Garhwal, Hardwar, Dehradun, and

Uttarkashi districts (see Figure 3.4). As Rudraprayag district is in Garhwal, all participants in this study spoke Garhwali as their first language, and identified as Garhwali culturally. Garhwali culture includes distinct songs, dances, folklore, and foods, aside from the local language (written and spoken). Oral history and other oral traditions, such as folk songs, are extremely important not only for the transmission of knowledge, but for self-expression, community gatherings, and cultural reproduction (Capila 2002).

Most Garhwalis are Hindu, though there is a significant population of Muslims and Sikhs, as well as small populations of Christians, Buddhists, and Jains (Directorate of Economics and Statistics 2009). Three main social groups make up the Garhwali population: *Kols*, who are believed to be the original inhabitants of the region, are generally considered lower caste and are often artisans, craftspeople, carpenters, and do not own much land. *Rajputs* are people who have immigrated to the region from adjoining states, or who escaped to the mountains during Mughal Rule (1500 AD-1800 AD). Most of the participants in this study considered themselves *Rajputs* and believed they were originally from the state of Rajasthan. *Rajputs* make up the majority of the Garhwali population and also tend to own land. The third group, *Brahmins,* are believed to have migrated from other states for pilgrimage and eventually settled (Capila 2002).

Rudraprayag is a mountainous district crisscrossed by tributaries of the Alaknanda and Mandakini rivers, which join and eventually form the Ganga in Devprayag (HIMJKAS 2002). There are a total of 658 villages in the district, and village size averages 326 residents (HIMJKAS 2002). Some villages are separated from other villages by valleys or forested land and are

relatively isolated, while other villages are closely clustered together and appear to be one large village, but are actually separate entities. Homes are generally built close to water sources with larger villages situated on flatter ground closer to the larger rivers, and sparser constructions on the hillsides in proximity to natural springs or streams (Capila 2002).

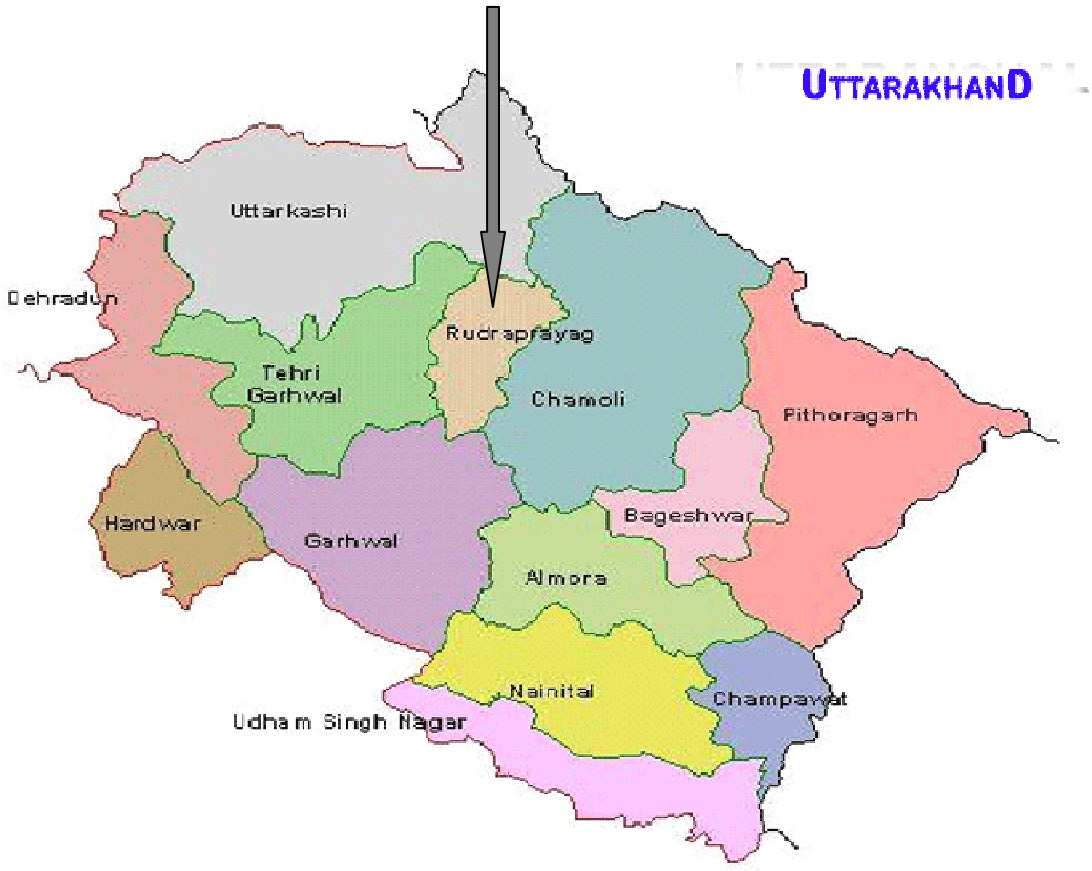

Figure 3.4. Map of the state of Uttarakhand. It is divided into 13 districts. Research for this study was carried out in Rudraprayag district. Garhwal is a region referring to the western half of the state including Rudraprayag, (Pauri) Garhwal, Tehri Garhwal, Hardwar, Dehradun, and Uttarkashi. Garhwal is a region in which people identify as Garhwali culturally and speak the Garhwali language.

The villages in which I carried out field research are located in what are considered middle elevations, which range from 3000 to 6000 feet (Maikhuri et al. 2001). They are clustered in three main areas along major paved roads that lead to two important pilgrimage sites, Kedarnath and Badrinath (see Figure 3.5). Being on these major roads or within ten kilometers of them means that there is a significant amount of tourist traffic during the summer months. There are also other tourist areas such as forest preserves that draw visitors throughout the year on these same roads. The proximity to the roads also allows these villages easier access to market centers and public transportation, as well as greater contact with tourists.

The first area of villages visited in this study was within ten kilometers of Saari Village (a tourist destination with a small lake and a Hindu temple). Several of the villages were clustered together along the main road, appearing to be one large village, while other villages were a few kilometers further, on the other side of the valley. There were a few small markets along the main road in this area owned by local families which carried items such as tomatoes, onions, eggs, candy, and soft drinks. These villages were also only ten kilometers southeast of Ukhimath, a relatively large marketing town with an outdoor produce market, a few guest houses, schools, and electronics stores.

Figure 3.5. Rudraprayag District Map.

This is the site of the first set of interviews near Saari village as well as the third focus group, which took place in Saari village itself.

This is the site of the second set of interviews and the first two focus groups, Kandara village.

This is the site of the final two interviews, in Rounlenk (Raun).

→ This arrow denotes the route to Badrinath, a very important sacred site. Badrinath is another 100 kilometers slightly east and mostly north of Gopeshwar.

The second field site was a larger village called Kandara. This village was considerably larger than the separate villages near Saari. Kandara is approximately 20 very winding kilometers from Chandrapuri, which is also a larger marketing town (not as large as Ukhimath), and is along the main paved road. The road to Kandara from Chandrapuri is mostly paved and is crossed by small streams without bridges. Villagers previously used to walk these distances in order to travel, but now there are regular vans which leave Chandrapuri for the surrounding villages throughout the day. During the rainy season, however, the roads are highly unpredictable as landslides are quite common. During my two months of fieldwork, I witnessed many landslides and destroyed roads which either led to traffic delays or meant that van drivers would drive as far as possible and leave passengers at a site where the road was either covered in rocks and soil, or was washed away. From that point, passengers could either continue walking to their destination, or another van would be waiting on the other side of the impasse to pick them up. Within Kandara village itself, because it was quite large, there were several medical shops, small food markets, and a tailor, whereas the Saari village area did not have as many shops within walking distance of the village homes.

The third study area was Rounlenk village, approximately 20 kilometers northeast of Ukhimath. This route is traveled by vans regularly throughout the day and can take an hour. However, during my visit my guide and I traveled for four hours in order to reach his home in Rounlenk because of landslides and road destruction due to the monsoon rains. Rounlenk is smaller than Kandara village and is relatively isolated compared to the cluster of villages in the Saari area. There are several medical and food shops within the village itself, however.

One common practice in many of these villages is that when families buy large quantities of rice, flour, oil, or other heavy supplies (such as 50kg bags) from Ukhimath or Chandrapuri, several families from the same village or nearby village hire a jeep together and load the supplies onto the roof, while passengers ride on the inside. The jeep then drops off supplies and passengers at their respective homes for an agreed upon fee. Driving jeeps and vans, running markets and shops, and working in guest houses or as tour guides are some of the newer job opportunities for young men who stay in the region.

Since all of the land in the district is relatively mountainous, the homes are built into the hillsides, and the fields are all terraced. Some terraces are very narrow, and on less steep inclines the terraces are wider. Roads, markets, medical shops, and other "developments" are relatively recent in these villages — road construction began in the 1960's, and other markets and shops were built after that time. Thus, the older generation remembers the village as it was, without the possibility for transportation by motor vehicle, before medical shops and the presence of western-trained doctors. The older generation also remembers the traditional ways of eating before the possibility of purchasing food supplies from the markets. Elder women carry a tremendous amount of knowledge in regards to traditional agricultural and food systems, as they have been chiefly responsible for the cultivation and preparation of food in Garhwali families.

4. METHODS

This study employed two qualitative methods – semi-structured interviews and focus groups. Data was gathered during the months of June and July, 2011. Fourteen interviews were conducted in total — thirteen with women ages 60-80, and one with a male traditional healer in his 60's. Three focus groups were conducted with groups of women of ages ranging from 24—72, and the groups had between seven and sixteen participants. The interviews and focus groups were carried out in several villages of the middle hills in the Rudraprayag district, Uttarakhand, India. Though I did not formally employ participant observation as a method, staying in families' homes, working in the gardens with women, and spending two months in the region allowed for some more informal observations that complement the data collected through typical interviewer/interviewee interaction.

Qualitative methods were chosen for this study because they allow the researcher to reach the insider's or emic perspective, and help the researcher to understand the meanings that are attributed by the insiders to behaviors, objects, or interactions. These methods allow for themes or patterns to emerge based on the respondent's experience, themes that the researcher may not be able to anticipate based on personal experience or a study of the literature (Patton 2002). The respondents were chosen purposefully (as opposed to randomly) in order to more deeply understand the experience and perspective of elder women in the middle hills of Uttarakhand in regards to diet change, traditional food systems, and health. These respondents have life experience and knowledge about the topic of interest because as elders they are experiencing major changes to the Himalayan environment, culture, and

traditional agricultural and food systems in their lifetime. Younger generations have been exposed to aspects of the modern food system since their own childhood. Thus, elders have lived and are living significant changes to the traditional foodways in the hills. Moreover, as women, they have been primarily responsible for the cultivation and preparation of traditional crops and foods (Agarwal 2002). These experiences are important for understanding patterns that emerge (Hesse-Biber and Leavey 2006), but can also be used for understanding the meaning of quantitative results, or to guide a quantitative study (Chung 2000). Qualitative methods are particularly useful in subject areas about which little is known, such as the villagers' reasons for choosing the foods they eat; for understanding the experiences of marginalized populations, such as elder women in the Himalaya; and to document a process, such as diet change (LeCompte and Schensul 1999).

The interviews were "cultural," aiming to understand the day-to-day experiences of the respondents, letting the respondents express what is important to them (Rubin and Rubin 2005) within the context of talking about diet change and health. This was facilitated via semi-structured interviews which allowed the respondents space to share what they found relevant while speaking about the topic of the study. The question set that was developed (see Appendix A) helped to guide the conversation toward the topics of interest in this study, yet were left open to allow themes and patterns to emerge that could not have been anticipated by the researcher. Interviews provided a forum for drawing out the kind of depth and detail which actually illustrated changes to a person's behavior and attitudes, such as what types of food they prepare, how often, and with whom; how these behaviors have changed over time; as well as feelings about these processes.

Focus groups are a qualitative method which can be used to develop a general understanding of the subject population, in this case elder women, in order to construct more appropriate interview questions. They can also allow participants to feel more comfortable than they may feel in a one-on-one interview, and, therefore, share different types of information. The group discussions can also reveal participant consensus or disagreement about particular topics (Krueger and Casey 2000). In this study, focus groups were used in order to create a space which would allow participants to share information they might not have thought of in an interview – several of my interview questions required women to recall their daily diet of fifty years back, and being with other women of the same generation allowed for greater recall. The focus groups also served as a way to check for the level of consensus on certain topics, such as the perceptions of the health benefits of traditional crops and the level of drudgery women have experienced in the region over time.

These qualitative methods were employed in order to gain an understanding of the knowledge and experiences that elder women in Rudraprayag villages hold in regards to diet change and the health benefits of the traditional diet. Though significant research is taking place on the issues of agricultural change and traditional crops in the Himalayan region, most studies do not specifically undertake interviews with women, though the researchers may acknowledge that women are significant knowledge holders. Moreover, the focus on women's everyday lives and on women's unique knowledge and perspective that comes from their distinctive experiences and gender roles can lead to "empirically more accurate descriptions and theoretically richer explanations" (Harding 2001: 145) in regards to diet change and the health of the traditional diet, according to feminist standpoint perspective.

Population

All women who participated in focus groups and interviews were born and raised in the middle hills of the Himalaya (3,000-6,000 ft. altitude) in the state of Uttarakhand, Rudraprayag district. Some were interviewed in their birth village and others were interviewed in their husband's birth village where they moved after marriage. All women interviewed spoke Garhwali, a language specific to a region of the Himalaya known as Garhwal, which includes Rudraprayag, Tehri and Pauri Garhwal, Hardwar, Dehradun, and Uttarkashi districts in the state of Uttarakhand (Figure 3.4). Though the language is also derived from Sanskrit as Hindi is, they are not similar enough to be understood without learning the other language. Some of the younger women spoke Hindi due to schooling, and most, including elder women, understood it well. None spoke or understood English. All of the women gave their names as a first name followed by *Devi,* which refers to the female aspect of the divine. It is not a last name or family name but seemed to be a general term for women in the villages I visited. The first names used in this study are pseudonyms.

The women followed a similar daily routine which starts at dawn. The first task, after having tea, is milking the cows, followed by collecting grass for the cows from the forest or fields. Then women generally return home to make and eat breakfast, after which they go out to work in the fields. In the afternoon they return to make and eat lunch and rest for a short time, returning to the fields for several more hours. Finally, they go to the forest or the fields to cut grass for the cows again in the evening, and return home to make and eat dinner. Other tasks they engage in on a daily basis are caring for children, washing clothes and dishes, and cleaning the home area (sweeping, etc). Gathering fire wood is also an important task, but not

necessarily carried out daily. The level of intensity of the work differed based on age, the presence of other members of the household able to carry out tasks, and income level. Elder women ages 60-80 were the target population for interviews and focus groups. Interviewees generally fell into this age category, but focus group participants were mixed, ages 24-72, with the majority of women falling into the age range of 40-60. Though still involved in daily farm and home tasks, elder women were easier to find at home. However, in some cases, interviews were carried out in the terrace fields as women worked.

Data Collection Sequence

The first set of data I collected was a series of nine interviews with women from several small villages in the Saari area of the Rudraprayag district, 12 kilometers from one of the larger towns in the district, Ukhimath (see Figure 3.5). This area was chosen because many families continue with traditional agricultural and food practices, yet due to the high tourist traffic and the recent road construction, they have experienced many changes in their culture, lifestyle, agricultural practices, and diet. Moreover, the NGO I worked with has a long-standing partnership with the translator who assisted with this set of interviews. This translator was born and raised in the study area, and though male, his history in the village allowed for a level of comfort and familiarity with the village women during the interviews. Many elder villagers, particularly women, have not received a formal education and are not literate. Thus, a foreigner coming in and asking questions can be intimidating and can cause the participants to be less open. Having a translator from the area with a long-standing commitment to the

community and long-standing familial relationships helped establish a sense of informality, while still allowing for the sharing of detail and depth of information.

This set of interviews was conducted over a period of two weeks in which I stayed in the home of the translator's family. Each morning, I participated in farm activities such as cutting grass for the cows, weeding garden plots, harvesting crops, planting seeds, and watering. These mornings served as informal observation sessions, as I watched my host family as well as neighboring families at work. After morning work and breakfast, my translator and I set off to meet with elder women, either his relatives, neighbors, or other community members such as midwives. The interviews were not scheduled, but were set up as informal visits in which we would arrive at the house at a time when we thought women would be a little less busy (as they are always busy). We would be served tea and my translator would introduce me as a friend and a student from the US who is interested in agriculture. We would engage in light conversation over tea and after a few minutes I would introduce my research and my study (see consent script, Appendix C) and ask if they were willing to answer a few questions. The first few interviews were used to develop a question set (see Appendix A) which was used throughout the remainder of the study. I audio recorded the conversation with participant permission, when possible.

The second set of three interviews was conducted in Kandara village (see Figure 3.5) of the Rudraprayag district over the course of five days. This location was chosen for similar reasons as the Saari area – I had connections through the NGO, and it is also an area which is undergoing change due to road construction. Though Kandara is not a touristic village, it is only 10 kilometers off the route to Badrinath and Kedarnath. In Kandara I was assisted by a woman

who is a community leader in her village. She was the entry point for the interviews, while two female students from a local university, both from Garhwali speaking families, helped with translation. Three interviews were conducted in Kandara village as well as two focus groups. The interviews were also not formally scheduled, but were arranged as we met women along our walks as our guide led us through the village. The interviews were also informal in the sense that we would begin with light conversation over tea, and then when we felt that participants were comfortable with our presence, we introduced the study and began the questions. These interviews were not audio recorded.

The final two interviews took place over the course of three days in Rounlenk village, ten kilometers from Ukhimath village (see Figure 3.5). Again this village was chosen due to the connection with the NGO and because my guide in this village was a traditional healer interested in sharing his knowledge with me and showing me his village. In the first interview I spoke with a couple in their 60s, and the second was with the guide himself, who also served as my translator in this village. This interview was conducted due to the fact that this healer held significant knowledge of the health benefits of traditional foods.

The first two focus groups conducted in this study both took place in Kandara village and were also arranged by my guide. As mentioned above, she is a community leader and also participates in women's groups in the village. Thus, through one phone call she arranged for some members from the women's group to meet in a local home within an hour of her call. We arrived and as we waited more and more women began to arrive. The group had 16 participants, ranging in age from 29-72. The second group was also arranged by our guide making a few phone calls and asking some friends, neighbors, and elders to join us for a

conversation. This group had seven participants of ages 30-70. Both of the focus groups were audio recorded.

Interview #	Interviewee(s): Pseudonyms, Gender, and Ages	Location
1	Anjali Devi, F, 70 Amita Devi, F, 70	Daida Village
2	Bairavi Devi, F, 80	Daida Village
3	Chanda Devi, F, 50	Daida Village
4	Divya Devi, F, 60	Rodu Village
5	Eka Devi, F, 65 Eesha Devi, F, 70	Gwar Village
6	Gauri Devi, F, 65	Gunda Gwar Village
7	Hasna Devi, F, 68	Gunda Gwar Village
8	Indu Devi, F, 81	Ussara Village
9	Janki Devi, F, 75 Jaya Devi, F, 73	Kardhar Village
10	Kavita Devi, F, 70	Kandara Village
11	Lalita Devi, F, 72	Kandara Village
12	Madhu Devi, F, 73	Kandara Village
13	Narenderji, M, 62	Rounlenk Village
14	Oma Devi, F, 65	Rounlenk Village

TABLE 4.1. Interview Profiles. Interviewees in all cases but one were female; and in all cases but one fell into the target age range of 60-80. These first nine interviews took place within ten kilometers of Saari village, another tourist site in the region.

The third and final focus group took place in the Saari area, the area of the first set of interviews. My first host family contacted a small group of women in Saari village, who were also involved in a regular women's temple group. The group met with us in the home of one of the women. The two female university students who also translated the interviews and focus groups in Kandara village assisted as translators for this focus group. This group was slightly

more formal in the beginning because we did not arrive with a local guide, but eventually became comfortable. The ages of the participants ranged from 24-52 and several small children were also present. In this group, as in the first focus group in Kandara village, the eldest women participated the most. In the second group in Kandara village all participants shared more equally.

Focus Group #	# of Participants Present	Gender and Ages	Location
1	16	All Female; ages: 72, 63 55, 54, 54, 52, 49, 49, 42, 41, 41, 40, 36, 36, 29, 29	Kandara
2	7	All Female; ages: 70, 50, 51, 50, 49, 32, 30	Kandara
3	7	All Female; ages: 52, 50, 45, 45, 45, 35, 24	Saari

TABLE 4.2. Focus Group Profiles. The focus groups included women of a wide age range, and were generally younger than the target population of this study. However, elder women in at least two of the groups participated more than younger women.

Interviews and focus groups lasted anywhere from a half hour to an hour. After each interview and focus group I typed my notes and I debriefed with my translators about the information we received, attempting to record any pieces of information that they received and perhaps had not translated. I also wrote memos of any themes that were emerging, as well as refined the question set throughout the data collection period. After completing the first nine interviews I sat with my translator and he re-translated each recorded interview line by line. The three interviews carried out in Kandara and the two in Rounlenk were not recorded.

One important note is that most of the interviews were not one-on-one. Villagers in Rudraprayag district live in joint families and in some cases very close to their neighbors. Thus, in almost all interviews, other family members were present and were either in and out of the conversation, or participated throughout. I attempted to direct my questions at the target population of this study, elder women ages 60-80, in any situation. In a few of the interviews two women were present who fit the target population. In most cases I was able to direct my questions to the elder woman/women present and other family members listened and contributed occasionally. In one case, I asked a woman to sit closer to me and told her husband that though I was interested in hearing what he had to say, I needed to speak to his wife. He understood, let her speak, and eventually left the conversation. The fact that in most interviews several family members were also present aside from the target population raises concerns that an interviewee's response would be modified by the presence of others. It is possible that a respondent did not reveal the extent to which she experienced difficulty as a woman in the presence of her husband, or that she did not go into great detail about the past due to the presence of younger family members. However, I did not feel it would be culturally appropriate to ask an elder woman to leave the group situation in order to have a one-on-one conversation with me, especially because the subject matter was not highly sensitive. Though several interviews were one-on-one, that was circumstantial – no one else happened to be present at the moment of the interviews. However, asking a woman to sit separately for the interview while she was already seated with her family members would have created a level of formality that would have actually taken away from the level of comfort that I sought to establish.

Analysis

The data collections were analyzed using emergent themes, codes, and summary statements. These summary statements were considered the main findings of the study which are discussed in the Results section, where direct quotes and other direct references to data were used to support the main findings.

Data for this study are text and recordings, and include notes from interviews that were not recorded; translation notes from recorded interviews (where possible); notes from focus groups; memos; notes on observations; notes from other informal conversations; and the recordings of interviews and focus groups. A list of themes was developed based on repeated readings of the texts and listening to the recordings. These themes were used to develop codes which were then applied directly to the text of the data collections (See Table 4.3 below for examples of codes). For example, in the data, wild-gathered green leaves emerged as an important food since it was mentioned in almost all interviews and focus groups. A code was developed to sort data that referred to changes in the use of green leaves in the diet (DIET-GREENS), and to sort data that contained participant knowledge or perceptions of the health benefits of wild-gathered green leaves (HEALTH-GREENS). Coding the data for these themes, sorting the coded data, and summarizing the coded sections led to a finding that the use of wild-gathered green leaves has declined in the diet, and that the leaves are considered highly nutritious. This method of analysis was applied to the entire data collection and has been used to develop the main findings of this study.

CODE	DEFINITION	HOW TO APPLY	EXAMPLE FROM DATA
DIET-GREENS	The use of wild/gathered green leaves in the diet; changes over time	Apply to responses which describe the use of green leaves in the diet and changes to the usage over time	No longer gather as much *kandali* (nettle)
DIET-GRAINS	The types of grains grown and/or used in the diet; changes over time	Apply to responses describing the cultivation and/or use of grain including millets, rice, wheat, etc in the diet and changes over time	Loss of old varieties of rice such as medicinal black rice
CHG-MARKET	Use of market or shops to purchase food supplies	Apply to responses describing the changes associated with the diet due to access to market	Purchasing and eating packaged products such as *Maggi* (dry noodles with flavor packet)
HEALTH-HOME	The perception of the healthfulness of food depending on whether food is homegrown or store bought	Apply to responses describing where the food is grown or purchased and how that affects the quality or healthfulness of the food	Homegrown grain fresher/healthier; Public Distribution System (PDS) grain sits for very long periods of time and is less healthy

TABLE 4.3. Samples of Codes Used in Data Analysis. These codes were applied to the text of the data using the abbreviation in the first column and following the rule in the third column. Coded sections of data, such as in the fourth column, were then sorted and summarized in order to generate summary statements. These statements were considered the main findings of the study.

Validity

In the first series of interviews my translator was male, and therefore, in a study attempting to document women's knowledge, this raises significant validity concerns. Though he was a unique man in that he participated in "women's" work such as milking the cows,

cutting grass, planting seeds, and pulling weeds, which most men would not do, he was still raised into the patriarchal culture of the villages. Thus, it is possible that women participating in the study were not able to share their concerns fully with a man present; or that the way in which he asked questions or translated their responses did not pick up on experiences that a female translator would have interpreted differently.

Secondly, this study has a significant "roadside bias" where "most learning about rural conditions is mediated by vehicles" (Chambers 1983: 13) and communities further from the road are not observed or studied. All interview and focus group participants in this study lived within two kilometers of motor roads. Though road construction in the Himalaya has increased significantly since the 1960s (Kreutzmann 1991), many villages in Rudraprayag district and the Himalaya as a whole are still far from roads. Thus the experience of villagers not living near roads is not represented and could be significantly different.

Finally, as a researcher in the Rudraprayag district I was an outsider. I am not a native Garhwali speaker, nor am I an Indian citizen. Thus, I truly entered the work as a foreigner, though of Indian ancestry. The level of depth of a translated study must necessarily be less than a study conducted in a language one speaks fluently. I am also an educated American and therefore perceived to be "modern" and "urban" by the villagers, so they may have experienced some level of timidity, or may not have completely trusted my intentions as an outsider. They could have also felt that I would not fully understand their experience. This could have affected their level of openness as well as the types of information they shared.

5. RESULTS AND DISCUSSION

The results of this study are organized into three sections – changes to the hill diet, women's experiences and views of the traditional diet, and structural conditions related to diet change. The section which describes the changes in the hill diet is organized by the types of foods found in the diet. The extent to which traditional foods were eaten in the past, the ways they were prepared, and how their place in the diet has changed is described, as well as newer patterns in the diet. The second section will discuss women's experiences and views of the traditional diet, including health, hunger, and the ways in which women's diets differ from men's. The third section will discuss structural conditions that are related to diet change, such as changing ecological conditions and the construction of roads, which affect food availability and crop productivity. The specific changes in the diet, the experiences of the traditional diet, and the structural conditions taken together provide a greater understanding for the specific context of diet change in the study area, and about the level of risk Himalayan communities may be experiencing in regards to negative health consequences, and loss of traditional knowledge. These conclusions ultimately can inform policy, educational and development programs aimed at improving the livelihoods of Himalayan communities.

A. Diet Change

Respondents were asked to recall their daily diet from the past. The information and experience they have shared is from their memory, and from a time period corresponding to the particular respondent's childhood and young adulthood. Most respondents were in their 60's, and the majority of responses are in reference to the changes in the hill diet over the course of their lifetimes. General trends over the last fifty years, particularly the last 15-20, are considered to be the time period to which women's recollections are referring. There was very little discrepancy among the responses of the interviewees in regards to general trends in diet change. Thus the results will be discussed as such, unless otherwise noted.

The traditional hill diet, as described by the respondents, consists of grains, green leaves, vegetables and fruits, spices (*masala*), drinks, dairy products, oils, wild foods (non-cultivated, gathered from forest or cleared land), and pulses (beans and lentils). This section is divided into subsections, treating each aspect of the diet separately. Garhwali names will be used throughout this section in order to maintain a sense of the cultural context of the diet and the importance of some of these words to the respondents. The Garhwali words will be used in italics throughout the text. The first time they are used, the English translation will be given in parentheses. In some cases I could not find the English word for a specific food. A table at the end of each subsection gives the Garhwali and English (where possible) names for the foods as a reference.

Green Leaves

Green leaves were a major part of the hill diet in the past, whether grown in the field or gathered wild or as weeds. This section mainly deals with the greens that were gathered as weeds which means they were neither strictly a cultivated crop nor were they gathered from the forest – they grew without inputs on the edges of cultivated fields, in pathways, and in pasture land. These plants were eaten in at least one to two meals throughout the day, and in every season a different variety of greens were available. They were an extremely important part of the diet, prepared as a side dish eaten with a grain, cooked with grains as a main dish, or eaten raw. Greens were used to fill the stomach when other foods were not available. Though families still eat some greens many of the varieties, especially the ones which are gathered from forests or cleared land, are not collected and/or eaten anymore due to a number of reasons, including the work involved to gather and prepare them, and the status of these foods as foods eaten during times of hunger. This will be discussed in detail below in the sections describing women's experiences of the traditional diet, and the structural conditions affecting diet change.

The main seasons in the hills are winter (October – February), spring/summer (April – June), and rainy season (July-September), and are intimately linked with the hill agriculture and diet. Respondents generally listed all foods, including greens, by the season in which they were gathered or grown. In the winter they ate *rai*, *muli* (radish), and *gharia* (mustard) which are all cultivated. Between winter and summer they ate *bhathua* (lamb's quarters), *bodila*, and *kandali* or *bhichu ghas* (nettle), which are all gathered from cleared areas or the forest. In the

summer *lal marcha* (red amaranth) leaves, *cholai*, and *savoti* were available. In the rainy season, they ate *sola* (pumpkin leaves), which are also cultivated. Many of these greens, *bhathua*, *bodila, kandali, cholai* and *savoti,* were gathered either in the forest, from pasture land, on the margins of fields, or from the fields themselves as weeds. These greens often grew due to other agricultural activities, so were neither completely wild nor cultivated. For example, Hasna Devi related a story of how villagers would collect greens such as *bodila* from a pasture area where goats would stay during the rainy season, saying, "During winter snow covers the area, then the snow melts and spring comes, *bodila* grows there and people would go collect it." She described how after the rains in July and August and after the snow in the winter, *bodila* would grow in the spring, but only in the areas where goats and sheep had been pastured during the rains. She continued on to say that, "presently there is a lot of *bodila* but no one collects it." Most families do not gather the greens that grow in cleared land or forests anymore due to several reasons including the work involved and the status of these foods as foods eaten during times of hunger. They do continue to grow some of the traditional cultivated varieties.

The traditional hill diet depended on greens as a means to fill stomachs. Greens were eaten during the afternoon meal, with dinner, and sometimes while women worked in the forest or field during the day. Many women in one focus group described spending the entire day in the forest and the fields without bringing an actual meal, but would bring *palak* (spinach) from their home gardens, gather *burans* (rhododendron) flowers from the forest, and would chop these up together to fill their stomachs while they worked. Greens were prepared as a vegetable side dish and eaten with *roti* (flat bread) in the morning or night meals. *Kapala* and

depala, two dishes which were mentioned repeatedly by every participant, were prepared regularly for lunch. These two dishes were prepared by boiling any green leaves (gathered or cultivated) and mixing in flour made from either wheat or millet, and adding buttermilk. The bulk of the dish was greens, the variety depended on the season, and when there wasn't enough flour, the dishes were still prepared using greens and buttermilk.

Women recalled the importance of green leaves in the diet, how they would be used to fill their stomachs, and how they depended on them especially when grains and other vegetables were not as plentiful. Indu Devi described the place of greens in the past diet: "People used to have no income so people filled their stomachs with black *palyo* (made with greens and a specific type of millet considered black in color) and *kapala*, they would just drink it. They would take *kandali*, *bodila,* and make *kapala* and fill their stomachs." Most also emphasized the change in the role of green leaves in the diet, from a foodstuff they depended on to one that is eaten occasionally, for a change in taste. This is particularly the case for the greens that are gathered. For example, *kapala* and *depala* are not prepared regularly anymore by the interviewees for many reasons, one being that families do not enjoy the dishes as much as rice and *roti,* which are now much more readily available. Green leaves in the present are more often cooked as a vegetable side dish, one of a choice of many vegetables now available, to a meal of rice and pulses, or eaten with *roti*.

Garhwali	English
Rai	?
Muli	Radish
Gharia	Mustard
Kandali/bhichu ghas	Stinging Nettle
Palak	Spinach
Lal marcha	Red Amaranth (leaf)
Cholai	?
Savoti	?
Sola	Pumpkin (leaf)
Bodila	?
Bhathua	Lamb's quarters, pig weed

Table 5.1. Green Leaves.

Grains

The hill diet depended on a number of traditional grains and their varieties, which are broadly referred to as *mota anaz* by Garhwalis. Major grains described by the interviewees were *mandua* (also called *koda)*, *jhangora* and *koni* (finger, barnyard, and foxtail millets); *marcha* (amaranth); *jao* (barley); *dhan* or *sati* (rice), and *gehun* (wheat). The grains were and continue to be seasonally cultivated. They were eaten, traded, stored for long term food supply, and used for seed for the following season. The *mota anaz* were used for a number of traditional dishes and eaten at each meal, though when grain supply was low families experienced hunger and depended on green leaves and dairy products since no markets were available. Though all respondents said they continue to cultivate a number of traditional varieties, families no longer depend on the *mota anaz* for their yearly food supply, and have transitioned to a diet mainly based on wheat flour and rice purchased from the market.

Though hill farmers have traditionally grown wheat and rice, the traditional varieties are different than the types of wheat and rice found in the markets today, and many are no longer

cultivated by the villagers either. Other traditional grains such as *mandua* and *marcha* are not readily found in the markets though they are still cultivated and eaten in small quantities, or used as fodder for cattle. In general, families depend on wheat and rice from the market, and though they still cultivate traditional varieties of wheat and rice, as well as millets and other *mota anaz*, their main source of grain is wheat and rice purchased in the market. Divya Devi described some of the main ways traditional grains were used in the diet:

> In the summer we ate mixed roti (*koda* and wheat); and in the winter we ate pure *koda* or mixed *roti* with *marcha* and *koda* flour. In the summer we ate rice, *kapala*, *depala*, *palyo* (all three dishes are prepared with flour or broken grain mixed with greens, generally made with traditional grains), and *jhangora bat* (barnyard millet boiled as rice would be). In the winter we ate rice, *jhangora*, *koni*, and sometimes *mandua* or *koda halwa* (*halwa* is prepared by boiling the flour of a grain and adding *ghee* (clarified butter)).

She added that presently people eat much more wheat and rice, and summed up the main change in the grain aspect of the hill diet in this way: "In the past people ate less rice and wheat *roti* but they filled their stomachs with their old foods," such as the dishes she described.

Most women recalled *kapala, depala,* and *palyo* as the major staple afternoon dishes. These three dishes were prepared with green leaves (either gathered or cultivated) as well as flour or broken grain mostly made from *jhangora* and *koni*, and sometimes wheat and rice. However *kapala*, *depala*, and *palyo* are not eaten regularly anymore, only occasionally for a change in taste. These days most women said they prepare white rice purchased at the market for the afternoon meal. The white rice and wheat flour available at the market is grown in the plains states of India such as Haryana and Punjab and are transported to the hills via road. The production and lower sale price of these two foods are supported by the Indian government, as part of government programs to alleviate hunger. Wheat flour and white rice are available

cheaply through programs such as the Public Distribution Program in which poor families can purchase these food supplies at extremely low prices (Kataki 2002). Traditional grains are not readily available in the markets in the hills.

Roti, eaten both morning and night in most households in the past and present, is an essential part of the hill diet. *Roti* was traditionally made with a variety of grains, and women identified seven types of *roti* that were prepared depending on the seasonal stocks of grain available. These were: *mandua*; wheat; wheat and *mandua* mixed; *marcha*; *mandua* and *marcha* mixed; *jao*; and *mandua* and *jao* mixed. Though many families still eat some *mandua roti*, most women interviewed said nowadays they mostly eat wheat *roti* made from flour purchased at the market for morning and evening meals. Hasna Devi reported that she never eats plain wheat *roti,* but always mixes *mandua* and wheat; and my host family in Kandara prepared *mandua roti* daily while I stayed in their home. However, these were exceptions among the women interviewed. Most respondents described a change from *roti* made from a variety of grains to mostly preparing *roti* with purchased wheat flour.

Jhangora, *koni* and *marcha* were also prepared as *bat* (whole grain boiled separately the way most people prepare rice) and eaten along with pulses or vegetables. Women said they used to prepare *jhangora, koni*, and *marcha bat* regularly, but not in the present. This is due to a variety of reasons such as the availability of rice in the market; the labor involved in the cultivation and processing of home-grown grain; and the lack of availability of the traditional grains in the market. Nowadays rice purchased from the market is prepared regularly for the afternoon meal.

Other dishes using grains that were prepared regularly include *halwa*, *sattu*, and *manu*. *Halwa* is prepared by cooking flour with water and adding *ghee* and *jaggery* (an unrefined sugar product). In the past, *halwa* would be prepared with *marcha*, wheat flour, or mixed flour (wheat, *jhangora*, rice, and sometimes corn). Presently *halwa* is prepared mostly with wheat flour. *Sattu* was prepared by roasting wheat, *kala bhat* (black soy bean), and *jao*, making a flour, and shaping the flour into balls. This preparation was easily transported into the fields by women to be eaten as they worked. The flour balls were dipped in water and eaten with *jaggery*. Bairavi Devi spoke about *sattu,* and though she did not remember eating it fondly, she remembered eating it to fill the stomach while women worked:

> In the old days some families ate *sattu. Sattu* was especially made just before summer season, around April and May. The women brought *sattu* with them to the field to eat while working. They would take the dry *sattu* in a container and mix it with water in the field when they are ready to eat.

Manu was prepared with *mandua* flour and mixed with water, boiled, and eaten with buttermilk. Some women described this dish as having been eaten by poorer families who could not afford other items that were considered more desirable or tasty. These dishes are not prepared regularly anymore by the women interviewed due to reasons such as taste and access to the market, though they are prepared occasionally for variety.

These dishes were all prepared with the traditional grains, are not eaten regularly anymore, and according to one woman, even if she or other women wanted to prepare *kapala*, *depala, palyo*, or *sattu*, they may not even have enough of the traditional grains to do so. In the past, most families depended completely on their fields to feed themselves, there were no markets. Currently, the average family produces enough food to feed themselves for three to

six months of the year at most. Thus, decreasing yield, as will be discussed below, is an important factor in the transition from *mota anaz* to market purchased grains.

Traditional grain plants were also valued not only for the food provided by the seed, but by the leaf parts as well. *Marcha,* for example, is a major source of green leaves that were a staple of the diet, aside from providing seed. Grain plants were, and continue to be, grown for fodder value as well. The stems of *marcha* were dried and stored for cattle feed. *Jhangora* was useful for feeding to cattle as the straw helps to increase milk production. Though families do not eat *jhangora* as a grain much anymore, it is still grown and valued as fodder for their cattle.

Though the traditional grains were high in variety, and considered highly nutritious, all respondents emphasized the level of hunger they had experienced. Grain yields were not enough in most families to provide an adequate food supply throughout the year, and other sources of food were not available. Women described eating only one *roti* in the morning before starting work for the day, or skipping breakfast completely. Before women had access to the markets they depended more on greens and dairy products to feed their families, and they experienced more hunger because of their household role to feed other family members first. Traditional grain plants were used in every way possible to provide enough sustenance and in many cases it still was not enough. Oma Devi and her husband described the level of hunger they experienced in the past which forced them to prepare a dish using the dried flower head of *marcha*, normally not considered a food, after the seeds had been harvested. They described, laughing and with some embarrassment, the process of harvesting the dried flowers, pounding them and making *halwa*.

Respondents have transitioned from a diet based on numerous types of grains, as well as many varieties of those grains, to a diet based mostly on wheat flour and white rice purchased at the markets. Though women continue to cultivate a number of traditional grains, some older varieties have been lost, and grain yield is low. Though they eat some of these grains, some are used as cattle feed, and the majority of the grain portion of the diet comes from the market. In the past grain production was also low to the point where many villagers experienced a significant level of hunger on a regular basis, which has been alleviated due to their ability to purchase grains at the markets. The markets (which will be discussed further below) do not carry traditional grains or varieties.

Garhwali	**English**
Dhan/Sati	Rice
Gehun	Wheat
Marcha	Amaranth
Mandua/Koda	Finger Millet
Jhangora	Barnyard Millet
Koni	Foxtail Millet
Jao	Barley
Roti	Flat bread
Kapala	Prepared with flour or broken grains mixed with greens
Depala	Prepared with flour or broken grains mixed with greens
Palyo	Prepared with flour or broken grains mixed with greens
Sattu	Prepared by roasting wheat, *kala bhat* (black soy bean), and *jao*, making a flour, and shaping the flour into balls
Manu	Prepared with *mandua* flour and mixed with water, boiled, and eaten with buttermilk
Halwa	Prepared by cooking flour with water and adding *ghee* (clarified butter) and *jaggery* (an unrefined sugar product).

Table 5.2. Grains and Grain Dishes.

Fruits and Vegetables

Vegetables are generally used to prepare side dishes which are eaten with rice and pulses, or with *roti.* Fruits are eaten as snacks between meals, though in the past fruits were used to prepare main dishes. Traditionally, people only had access to the vegetables and fruits they grew in their gardens, which varied with the seasons. During the rainy season the yield was the greatest. At other times of the year families would collect greens, wild foods, or not eat vegetables at all, using salt, onions, *ghee* and other elements of the diet to eat with *roti*. Some fruits were used that still grow, but are not used in the regular diet anymore such as figs and peaches; others were gathered wild and are no longer collected; and still others are newer to the region such as apples and *malta*, a type of orange. Some varieties of vegetables are simply not found anymore because they are not grown or they cannot grow due to climatic changes, and families have stopped eating as many green leaves as their access to other more desirable market vegetables has increased. Other vegetables, like onions, were not found in the past and are now staples. Though families rely on vegetables from the market now more than in the past, many women felt that homegrown fruits and vegetables taste much better than those from the market. Vegetable consumption and cultivation, however, seems to have changed less than greens, grains, and pulses. In general, fruits seem to have been and continue to be a less significant part of the diet than vegetables, so changes to fruit consumption, though somewhat significant in terms of the decrease in wild fruit consumption, was not referred to often by the women during the conversations.

Women described a long list of vegetables that made up a part of the traditional diet, many of which continue to be grown and eaten today in their fields, as well as purchased at the market. These include: *hari phalli* (green beans), *aloo* (potatoes), *tamatar* (tomatoes), *mirch* (chili peppers), *baingan* (eggplant), *kadu* (pumpkin), *muli* (radish), *palak* (spinach), *gharia* (mustard), *arbi* (taro root), *pyaz* (onions), and *kirikenda, chichenda, tori,* and *karela* (different types of gourds). Though many women said that in their childhood they did not eat as much onion (or any at all) as they do these days, this list of vegetables is generally consistent with the current diet. However, there may be new types of vegetables available in the market that were not previously available, as well as varieties of vegetables that were grown that are no longer found. Before the availability of markets, this selection of vegetables was only available during the rainy season, while the rest of the year families relied on green leaves, foods gathered from the forest, and fruits such as *timla, bedu* (both types of figs), and *aadu* (peach). Now, however, fruits and vegetables are available all year round at the local markets.

Timla, bedu, and *aadu* trees were grown on the terraces, and the fruits were an important part of the diet, often used as a vegetable (cooked or salted). They were used to prepare special types of dishes that are no longer prepared though the fruit trees are still producing fruit in families' gardens. Gauri Devi described how unripe peaches were smashed and mixed with salt and eaten with *roti*, a preparation called *kathela*. Currently *kathela* is not prepared regularly because families can purchase vegetables all year round, though it was remembered by some women as very tasty. It is likely that many families eat the peaches fresh as a snack (as I did with the host family), but that families do not rely on the peaches as part of their diet.

Timla and *bedu* formed an important part of the diet in past, serving to fill stomachs when other foods were not available. Several dishes were prepared using these fruits that were not spoken of as if they were delicacies, often spoken of in the context of eating to avoid hunger. Women described a variety of dishes prepared using *timla*. Some remember making stuffed *roti*, using the unripe *timla* which were boiled, made into a paste and put inside the roti. Sometimes they boiled the *timla* and mixed it with flour (a type of *kapala* using figs instead of greens). Sometimes they prepared the unripe figs with salt and *masala* (spices). These were not considered delicacies or dishes that women remember fondly, but were considered dishes prepared during times of hunger. Though *timla* and *bedu* trees continue to grow on the terraces, the fruits are not used to prepare dishes regularly anymore by the women interviewed. Again, perhaps like the peaches, they are eaten occasionally as a snack food. One day we went to visit a neighbor of our hostess in Kandara and we picked and ate many figs while in conversation with her. Neither she nor her family members were particularly interested in eating them, nor did they discourage us from eating them, but the tree was still productive.

Though many types of vegetables were grown in the past and continue to be cultivated and be a part of the hill diet, several women mentioned vegetables that are no longer cultivated due to a variety of reasons. For example, Eka Devi described several different varieties of pumpkins which are no longer planted because the climate is different and they do not grow as well - sometimes there are hailstorms and they get ruined; and there are insect problems they did not used to have. Some of the varieties of pumpkins they mentioned were *gol armyoth* and *twama armyoth*, as well as older varieties of gourds such as *kirikenda* and *loki*

they no longer grow. Indu Devi remembered lemon trees which produced a variety of lemon much larger than is found today. She described how in the past people would use these lemons to make chutney which was eaten with *roti*. However, this chutney is no longer prepared and one family spoke as if the fruit was no longer available.

Though some varieties of vegetables that were grown in the past are no longer found, grown or eaten, some new varieties have been introduced into the hill diet and fields. However, in general the major change in the vegetable aspect of the hill diet, according to the women interviewed, is the change from the previously limited seasonal availability of vegetables, to where families can now purchase vegetables at market year round.

Garhwali	**English**
Kadu	Pumpkin
Loki	Bottle Gourd
Kirikenda	Type of Gourd
Malta	Orange
Timla	Fig
Bedu	Fig
Aadu	Peach
Chichenda	Type of Gourd
Tori	Type of Gourd
Karela	Bitter Gourd
Gol Armyoth	Type of Pumpkin
Twama Armyoth	Type of Pumpkin
Arbi	Taro
Pyaz	Onion
Hari Phali	Green Beans
Tamatar	Tomatoes
Baingan	Eggplant
Aloo	Potato
Mirch	Chili Pepper
Muli	Radish
Palak	Spinach
Gharia	Mustard

Table 5.3. Fruits and Vegetables.

Pulses

The traditional hill diet includes many types of locally grown pulses (lentils and beans). The different types of pulses in themselves contain different varieties. Pulses are generally cooked as a main dish during the afternoon meal, as a stew, and eaten with rice or *roti*. Though families continue to grow and eat these local pulses, the quantity grown and eaten has decreased, and families now purchase pulses from the market. The market does not carry local varieties of pulses, and women feel that the market pulses do not have the taste of the locally grown varieties or the pulses from the past. Some varieties of local pulses are no longer found in their fields. Traditional dishes were prepared that were based on these local varieties, but are no longer eaten regularly, and many are remembered fondly.

All women interviewed ate pulses on a regular basis as part of the afternoon or evening meals. The types of pulses women listed include: *rajma* (kidney beans), *gehet/kulat* (horse gram), *kala bhat* (black soya bean), *safed bhat* (white soya bean), *desi bhat* (brown soya bean), *toor* (yellow pigeon pea), *urad* (black gram), *sontha* (cow pea), *lobia* (black-eyed peas), *gaitha, massoor* (red lentil), and *rains* (azuki bean). Lalita Devi remembered a few different varieties of each type of pulse that her family grew and ate in the past: They used to eat *rains* of which there was one type. There was also one type *gehet*; two types of *lobia*, one small and one big; two types of *massoor*; and two types of *toor*, a small red one and a big white one. She said there was one type of soya bean, but others in the room said there were two. And there were three types of *rajma*, one used for pulse and two for fresh vegetables (green beans). Other

women described three varieties of soya bean - white, black and *desi* or brown - and eight or nine varieties of *rajma*.

Hasna Devi became so excited when I asked her about the different types of *rajma* that she asked her young grandson, who had been listening intently to the interview, to bring out the container in which they stored the seeds. We then spent quite some time describing the different colors of seed and the characteristics of the different colors. Some seeds were pink and spotted, others black, some tan, others white, all stored together. As we sorted the different colors she commented,

> There are many varieties of *rajma,* but we only define them by the color. We didn't count the varieties (in the past). Presently we have fewer colors - some new colors, old colors are lost. Different color rajma have different tastes. If you make white only it is one taste, but if you mix it, it is another taste. Many varieties have been lost but I don't know how.

She and her grandson showed me how they identified varieties by color, size and shape, and though there are distinctions between the different colors/varieties of *rajma*, she said that they are sown, harvested and cooked together. She noted that she remembered many more colors than the eight we identified that day, but she is not sure why she no longer sees seeds that were sown previously. Hasna Devi speculated that it was perhaps due to pollination from varieties purchased at the market that were then planted alongside older varieties.

Though most women said that they continue to grow many of the same traditional pulse varieties, they felt that the yields had decreased in recent years. Some women said they used to sell surplus pulses, implying that the yield was high enough to be able to feed their families and to make a profit. Bairavi Devi recalled that "people used to grow a lot of *rajma* and a lot of *daal* (general word for a pulse or a dish prepared using any type of pulse). But these days there

is less on people's farms." Women described their increasing reliance on pulses purchased from the market, yet many felt that market pulses did not have the same taste as pulses grown in their fields, given that they could purchase the same variety that they grew. For example, focus group participants in Kandara said that they grow *urad*, but when they purchase *urad* from the market it does not have the same taste; perhaps, they speculated, because it comes from far away. They preferred the taste of the pulses grown in their own fields. Also, the market generally did not carry local varieties, so they felt that had to eat what is available. Chanda Devi referred to the taste of home-grown pulses, saying, "people used to make mixed *daal* – *rajma*, *bhat*, *gehet* – which was very tasty. But presently we cannot find such taste." However, families continue to eat pulses daily. Very often women will prepare *daal* in the afternoon that consists of a variety of pulses mixed together. This *daal* is also sometimes eaten at the evening meal.

Traditional dishes that were repeatedly described as having been regularly prepared previously using local pulses include *bhatwani, ghatwani, khumada,* and *chausa*. These dishes were also seasonally prepared, eaten in the winter during the afternoon meal. *Chausa* was prepared using black *urad* which was roasted, ground into a powder, and then flavored and boiled. *Bhatwani* is a similar preparation, but made with *kala bhat*. Sometimes a special *roti* was made by stuffing it with *gehet, sontha, lobia, rajma*, or other pulses. Though women do prepare these dishes occasionally, many women said they are not eaten as regularly as in their childhood and young adulthood.

The major change to the pulse aspect of the diet is an increasing reliance on pulses purchased at the market. These pulse varieties are not representative of the locally grown varieties. Those which are the same variety as a locally grown one do not have the same taste. Though families continue to cultivate many traditional varieties of pulses, some varieties are no longer found in the fields; and the quantity has decreased over time, substituted by market pulses. Dishes made from local pulses that were prepared regularly in the past are prepared less frequently in the present. However, pulses are still a daily part of the hill diet.

Garhwali	**English**
Rajma/Chaimi/Chamala	Kidney Beans (though people used it to refer to many other large beans)
Toor Daal	Yellow Pigeon Pea
Urad Daal	Black Gram
Gehet/Kulat	Horse Gram
Kala Bhat	Black soy bean
Safed Bhat	White soy bean
Desi Bhat	Brown soy bean
Sontha	Cow pea
Lobia	Black-eyed pea (one type of cow pea)
Rains	Azuki bean
Massoor Daal	Red Lentil
Gaitha	?
Chausa	Prepared using black *urad* which was roasted, ground into a powder, and then flavored and boiled.
Bhatwani	Prepared similar to chausa but using kala bhat

Table 5.4. Pulses

Dairy Products

Women remembered that their families had a large number of cattle, and, therefore, plenty of dairy products in their diet such as *dudh* (milk), butter, *ghee* (clarified butter), *chanch*

(buttermilk) and *dahi* (yogurt). These products were used to prepare a wide variety of main dishes and sweet dishes, and *ghee* was used for frying. Presently due to a number of changes socially and environmentally, families have fewer cattle and eat less dairy products. Families also prefer to sell some dairy products rather than eat all of them, a practice which would not have happened in the past culturally because it was looked down upon. Dairy products are seen as important to previous survival, and though less linked to survival today, are still considered healthy and a very important part of the diet.

Respondents recalled that *rotis* were eaten with *ghee* and salt, or *ghee* and honey, often in the morning meal. They would sometimes eat buttermilk and *roti*. This was often the case because families did not have enough other foods, such as vegetables or grains, to eat with the *roti*, and dairy products were very plentiful. Gauri Devi recounted that "in those days we had enough *ghee* and milk because we had a lot of cattle and no market to sell the products." Indu Devi said similarly that "people had enough *ghee* and milk, so they would eat or drink these plus buttermilk." Bairavi Devi noted that poorer families however had fewer cattle and therefore less dairy products, drawing attention to the difference in the diet of different families.

Many traditional dishes were prepared with dairy products. Anjali and Amita Devi described some of the traditional dishes that incorporated dairy products, mentioning *khadi*, which is still regularly eaten these days, prepared with buttermilk and flour; and *palyo*, similar to *khadi* but less commonly prepared today, made with *jhangora, koni*, or rice grains and buttermilk, or sometimes flour (made from a variety of grains) and buttermilk. Focus group

participants emphasized the importance of dairy products, along with wheat and rice, for children. Children used to eat milk, *ghee*, and *khir*, a sweetened preparation of rice and milk. Sometimes they would grind wheat and rice together and make *halwa* with milk for children.

Though most families still have some cattle, they have fewer than in previous years, and presently excess dairy products are occasionally sold at market. Thus, families eat less dairy products on the whole than in the past.

Garhwali	**English**
Dahi	Yogurt
Chanch	Buttermilk
Dudh	Milk
Ghee	Clarified Butter
Khadi	Prepared by cooking buttermilk with flour, which could be made from different types of grains
Khir	Prepared by boiling milk and adding either rice or other types of grain

Table 5.5. Dairy Products.

Wild Foods

Women traditionally gathered many types of wild foods on a regular basis to supplement the family's diet. Many fruits and other types of plants, including medicinal plants, were gathered from the forest while women worked. Though people occasionally gather produce from the forest in the present, most families do not gather food or medicine regularly from the forest anymore for a number of reasons, including forest regulations, access to the market to purchase food supplies, and cultural shifts in which gathering wild foods is associated with times when families were hungry.

Wild foods were often gathered while women worked in the forest gathering fuel and fodder. When they went to the jungle to work they would sometimes find fruits. If they found only a small quantity they would eat it themselves, but if there was enough they would bring it home for their families. Kavita Devi named several wild foods she remembered gathering regularly from the forest as a young woman: *kafal, ghingora, hisar* (a type of berry found in both yellow and black), *mol* (similar to a pear), *burans* (rhododendron flower - they would make juice by squeezing the flower or eat the flower for the nectar flavor); and *chaunda* (a root they would dig up and then scrape it and drink the juice from the root, a white liquid). Focus group members and other women from Kandara village also mentioned a few other fruits and other wild plants such as *kuthda* and *chandru* that they gathered as young women, but no longer do. *Lingoda*, or fiddleheads, were gathered from the forest and brought home and prepared as a vegetable side dish. During my stay with my host family we gathered *lingoda* several times. It was cooked with garlic and chili and we ate it with *roti*. However, most interviewees said they do not gather food regularly from the forest anymore.

Wild foods were an important part of the diet due to similar reasons that green leaves were – hunger and nutrition. Oma Devi recounted that as a young woman she and her family ate all the herbal plants that were available. They ate *kandali* and *marcha* greens as well as jungle plants. They ate all the local weeds because grain production was quite low. She also recounted the importance of having knowledge when gathering wild food in order to determine whether a wild plant was edible or not, such as *jaranga* and *arbi* (taro root). She remembered checking to see if these types of plants were edible by cutting the stem – if it was hollow they could eat that variety, and if the stem was full then it was a poisonous variety. She said they do

not eat anything from the forest anymore, pointing to the potential loss of knowledge of these wild plants if they are no longer gathered and eaten.

Traditionally wild foods were gathered while women worked in the forest and were also an important source of food due to low grain production. Though some families continue to occasionally gather wild foods, most families in the various village sites no longer regularly gather from the forest.

Garhwali	**English**
Jaranga	?
Mol	Type of wild pear
Burans	Rhododendron flower
Lingoda	Fiddle head (fern)
Kuthda	?
Chandru	?
Kafal	?
Ghingora	?
Hisar	Blackberry relative (yellow and black varieties)
Chaunda	?

Table 5.6. Wild Foods.

Oil

Vegetable side dishes are prepared using either oil or *ghee* to sauté, and oil is used to prepare the spices for pulse dishes. Traditionally oil was not used very often in hill diets due to the difficulty in processing oil seed by hand and the abundance of *ghee.* Families grew a variety of oil seeds, including *til* (sesame), *gharia* (mustard), and *bhangjeera* (perilla), and processed them by hand to make oil. No market was available to purchase oil so very little of it was used, or none at all, though families used *ghee* for frying. Now families use more oil in their cooking,

such as refined sunflower or soybean oils, because it is easily available at the market. Increased cooking oil consumption has been documented throughout India, and is linked to diet-related disease in urban populations (Misra et al. 2011), indicating the possibility of health risks in hill populations as well. Oil seed plants also were part of mixed planting groups, and these traditional planting systems are becoming less common. Some families continue to plant them nowadays though in less quantities, and none of the women interviewed mentioned processing oil seed at home in the present.

Garhwali	**English**
Til	Sesame
Bhangjeera	Perilla
Gharia	Mustard

Table 5.7. Oil Seeds

Drinks

During my two months in Uttarakhand I drank many cups of *chai* (tea, usually prepared with milk and sugar). *Chai* is taken first thing in the morning in the way that people from many other cultures drink coffee. Garhwalis often drink a second cup in the late afternoon, and it is always served to guests as soon as they arrive at one's home (and served to you if you are the guest). Garhwalis, including children, generally drink several cups of *chai* each day. This custom is relatively new in the hills - families did not drink *chai* regularly as they do today. They would drink water, buttermilk, home-made juice, and herbal preparations. One herbal preparation that was mentioned several times in Kandara village was *chakunda*. It is an herb that was used to prepare a tea that was taken regularly, especially by the elderly, before *chai* became

available. None of the interviewees described drinking herbal preparations regularly in the present. Oma Devi and her husband said that in the past, *chai* was used very minimally for medicinal purposes, but now *chai* is taken multiple times per day, including first thing in the morning, by most people including children. Juices were also made from fruits and flowers such as *burans* that were grown on local trees or gathered wild. Now, though many families continue to make their own juices from roses, *burans* flower, and *malta*, local markets carry juice concentrate, including a local brand called *Pahadi* which uses many locally harvested ingredients. Madhu Devi reported that her family used ginger, cumin and other spices to make preparations in the case of illness, but now juices are purchased from the market to treat those same illnesses. Another family who runs a tea stall and small market on the side of a main tourist route road was feeding a one year old child orange soda during the interview, demonstrating the introduction of purchased beverages, while in the past villagers did not have access to such drinks. One important change in the addition of *chai* and soft drinks is the increased consumption of sugar, which is linked to diet-related diseases such as diabetes in other regions (O'Dea and Piers 2002).

Respondents recalled that their families drank water, milk, buttermilk, home-made juice and herbals teas. Presently, though families still drink water, milk, buttermilk and some home-made juice, *chai*, sodas and store bought juice have become a greater part of the diet and herbal teas have become much less common.

Garhwali	English
Chai	Tea, usually prepared with milk and sugar
Chakunda	Herbal preparation

Table 5.8. Drinks.

Masala

Masala (spice) is used to prepare many cooked foods in the hill diet including pulses, vegetable side dishes, and chutneys. *Masala* is also considered to have health value, aside from its ability improve the flavor of foods. Women recalled that families grew all of their own *masala* and pounded them using the *silabata*, a large flat grinding stone (see Figure 5.1 – a photo of me trying to pound spices – I found that it is not such an easy process). Commonly used *masalas* were *adarak* (ginger), *lehssun* (garlic), *haldi* (turmeric), *jeera* (cumin), *dhaniya* (coriander), and *mirch* (chili pepper), all of which continue to be planted in families' fields and used on a daily basis. During the months before the rains and during the beginning of the rainy season, most families in the villages I visited were drying their own garlic supply, leaving it in the sun during the day and bringing it under a roof at night or when it rained. It was clear that many families still cultivate and use their own garlic. Women felt that pounding home-grown ingredients produced the best tasting *masala*. Nowadays, families still grow some *masalas*, but often purchase powders from the market, and even have access to some varieties which they did not have in the past, such as boxed spice mixes. However, many feel the store bought *masalas* do not have the same or as good of a taste as those home-grown and pounded on the *silabata*.

Garhwali	English
Adarak	Ginger
Lehssun	Garlic
Haldi	Turmeric
Jeera	Cumin
Dhaniya	Coriander
Mirch	Chili Pepper

Table 5.9. Masala

Figure 5.1 *Silabata.* My attempt to grind whole dried red chilis, garlic, and other spices into a paste using a small grinding rock on the *silabata.*

Section Summary and Discussion

The above subsections describe the specific changes to different aspects of the hill diet according to the respondents in this study. Certain aspects of the diet have changed more than others – the substitution of purchased wheat and rice for the wide variety of traditional grains is quite dramatic, while the types of vegetables eaten have not changed as significantly. However, the general trend for the aspects of the diet discussed above is away from traditional varieties and homegrown foods, toward an increasing reliance on foods purchased at market. *Masalas,* which were grown and processed at home traditionally, are now purchased in powder form by many families; soft drinks and packaged noodles are purchased at the market; and *ghee* made from families' cattle has been replaced by store-bought refined vegetable oils. Many of these trends reflect some of the patterns of diet change worldwide that are leading to increasing rates of diet-related disorders. They also reflect a departure from traditional systems based on local ecological knowledge to an increasing reliance on "expert" knowledge in the form of industrially farmed rice and wheat and packaged foods. Both of these trends could lead to negative consequences for hill communities in terms of health, cultural preservation, and sovereignty (in this case the ability to provide for one's own food supply).

At the same time, the desire to decrease workloads, changes in personal preferences and tastes, and the desire for cultural change are important factors that have led to people choosing a more modern diet. The following section describes women's experiences and views of the traditional diet, leading to a richer understanding of the diet changes described above.

B. Women's Experience of the Traditional Diet

While discussing the ways in which the traditional diet has changed and continues to change, women shared a diverse array of experiences and views of the traditional foods. In some cases these views were contradictory. Some views related to the health or nutritive value of the foods, the diversity, the freshness, and the taste of foods that are no longer easily found. At the same time, women shared less positive experiences with the traditional foods such as boredom with eating the same foods repeatedly, a lack of choice, insufficient quantities of food and hunger, restrictions to their diet as women, and heavy workloads associated with the cultivation and preparation of traditional crops and foods. These impressions will be discussed in the two subsections below and will provide the context for the third and final section which discusses the structural factors that affect diet change. The qualitative data in these two subsections complicate the picture of diet change, demonstrating that diet change is a complex interplay of personal choices within a context of structural opportunities and limitations. Experiences and associations people have with food and culture play into people's food choices, as do ecological, social, and political change. Moreover, these impressions reveal the importance of a gendered inquiry into these complex processes, as gender roles lead to different experiences of work, family life, and food.

Health

The majority of respondents shared a perception that people were healthier in the past, and that this health was due, in part, to the traditional diet. Traditional foods not only provide essential nutrients, but also contain medicinal properties (see Dangwal et al. 2008; Maikhuri et

al. 1999; and Narayanan and Kumar 2007). They are also fresh and tasty, and overall are perceived as healthier and of higher quality than food purchased at the market. Hasna Devi shared her view of the difference in taste between store-bought and homegrown foods:

> The taste of the new varieties is different than the older varieties. We look at the color and decide which is tasty and which is not. These days the pumpkins are not as tasty…The taste of the vegetables I grow are better than the ones you eat in your city. (She pointed to the onion drying on her terrace). These are tastier than the ones you eat in your city. The ones we grow ourselves taste better than the ones we buy in market. The onions from market are more bitter.

Aside from differences in taste between homegrown and store-bought foods, many of the respondents felt that people did not fall sick and were overall healthier and happier in the past, which was in some way related to the traditional diet. Anjali Devi shared her impression that people were stronger in the past and that there were fewer diseases, while in the present people tend to fall sick more easily and are weaker. She also felt that this was connected to the diet, saying that food in the past was pure and good, though it wasn't enough, and that nowadays food is sufficient, but it is not healthy. Members of both focus groups in Kandara felt that they were seeing diseases that were not encountered in the past, and that this was connected, in part, to the change in diet, as well as other changes such as clothing. One focus group member in Kandara gave a specific example, saying that nowadays people heal more slowly from wounds, whereas "in previous days when people cut themselves with their tools they would grab some medicinal leaves from the jungle and hold it over the cut and the body healed quickly." Indu Devi recalled that, "Sometimes we would feel some stomach pain. We would drink boiled water with salt. There was nothing extra we could give sick people, but we would give hot water with salt for stomach pains," and this type of remedy would be enough to help people heal. This ability to heal more quickly or to avoid illness was connected to the

traditional diet by the majority of respondents, due to characteristics of the traditional diet such as freshness and quality, and knowing where the food comes from. Focus group members in Kandara felt that food from their own fields is tastier, fresher, and healthier than food from market. They felt that something about cultivating food with one's own hands allows you to know about the food, whereas with food from the market one doesn't know everything about where it comes from. Though these views may be somewhat romantic of the past, they do shed light on the perception that in general, the traditional diet is believed to have contributed to the greater health people recalled having experienced in the past.

More specific examples of the healthfulness of traditional foods were also shared by many respondents. Bairavi Devi felt that "*kapala* gives a lot of energy… rice and wheat are not as nutritious and do not give as much energy." Hasna Devi, unique among respondents in that she resists the trend to depend upon purchased wheat flour said, "We never eat only *atta* (wheat flour), we always mix *mandua"* because "rice and *atta* are not good. You don't know how long the rice and *atta* has been in the store or where it comes from so it is not healthy for you." Indu Devi also emphasized that, "you don't know how long the rice and flour has been in the store or where it comes from so it is not healthy for you," adding, "people were stronger back then." Eka and Eesha Devi, while seated in their field with two younger women, taking a short break from their work to speak with us, shared similar opinions of purchased rice and wheat in comparison to traditional grains and greens. Eka Devi used the body language of strong arms to show the strength one gets after eating *kapala,* and she said it has a lot of vitamins. However, she said that rice and wheat *roti* do not give the same strength, pointing to one of the younger women seated nearby, saying she is weaker because she only eats rice and

wheat *roti.* Lalita Devi identified three dairy products - *ghee,* yogurt, and milk - along with *mandua,* as the foods that give the most energy; and focus group participants in Kandara named *mandua, jhangora, ghee,* and milk as the most nutritious foods. No respondents named white rice or wheat flour, or any other purchased item, as being healthier than the traditional grains and dairy products.

Respondents also described some of the medicinal benefits of the traditional foods, reflecting a similarity to many traditional cultures in which food and medicine are not completely separate categories. Narenderji, the male traditional healer, described the medicinal properties of *mandua,* useful in treating diabetes and digestive problems, as well as in its contribution to strong bones. He and Hasna Devi both described the use of *koni* grains to treat female reproductive disorders, specifically the use of seven year old *koni* grain. They both emphasized the importance of the age and the type of grain. Hasna Devi reported that, "Sometimes a lady has *suthigya* after delivery - she gets dysentery, vomiting, fever. People gave her old *koni bat*. The seven year old *koni* is the best." And she also described a type of black rice, not grown commonly in the present, which was used to treat women's reproductive disorders as well. Narenderji described the use of *lal chaval* (a traditional variety of red rice) used to treat kidney stones; of *jhangora* to treat jaundice when prepared with buttermilk; of *kandali* to treat joint pain; *timla* to treat dysentery and other digestive problems; and *mol* to help with lactation. Chanda Devi also described the use of *gehet* to treat kidney stones.

Respondents overall felt that people were healthier in the past and that the traditional diet contributed in part to the healthfulness of their communities. Respondents also attributed

healthy characteristics to many traditional foods including high energy content, nutrients, freshness, and medicinal properties, characteristics that were not attributed to purchased foods. Interestingly, this view is shared by all respondents who are also participating in a transition away from the traditional diet, bringing a sense of contradiction and greater complexity to an understanding of how and why traditional diets change. As Finnis found in her study in the Kolli Hills in South India, families preferred their traditional foods, but due to changes in the political ecology and the economy, were unable to access them (2007). Though the communities in the Kolli Hills are different than those of the Himalaya, Finnis' study lends insight into the complexity of the process of diet change taking place in Uttarakhand, and the importance of understanding the experience of the traditional diet and diet change of the community members themselves.

Women and Hunger

Hunger

The traditional diet was diverse in crop varieties, locally grown, healthy, and of high quality in terms of taste and freshness, but according to all respondents, insufficient. All participants reported experiencing hunger on a regular basis in previous years, and said they no longer do. People felt that they had no choice, that they had to eat the same foods over and over, some of which were not tasty. Now they feel they have more choice and can eat more for taste than necessity. Many used the word *mazburi* - which translates as helplessness or compulsion – when describing the traditional foods. They had to eat those foods, they had no choice. Families divided limited food supplies among members, with women often eating less,

due to their gender role to feed other family members first. Many women said they never felt full with their own family's food supply, nor did they have access to a market or income to purchase from a market. Respondents associated the traditional foods with the experience of hunger in the past, and, I argue, this experience of hunger is intimately connected to the significant changes in diet Garhwalis are experiencing. Foods which stir up memories of deprivation, eaten out of necessity, are not considered desirable in the present when other options are now available. Thus many traditional foods, due to their association with hunger and necessity, are no longer desirable, and this perception, combined with the heavy workload to cultivate them and the availability of store-bought foods are factors important to the context of diet change.

Hasna Devi, as all other respondents, remembered that in the old days they did not have enough to eat, so they ate what was available, but they never felt full enough. Gauri Devi recalled that sometimes she and her family did not eat breakfast, they would just eat two times in the day. Indu Devi elaborated:

> In those days there was not enough to eat. Sometimes we did not eat breakfast and only ate lunch and dinner but sometimes there was not enough food for lunch and dinner. Sometimes we would cook and serve what we had and split between everyone, but it may not always fill your stomach.

Many remember a feeling that some of the foods were not tasty, but they had no choice but to eat certain things to fill their stomachs. For example, Bairavi Devi described the use of *timla* in the diet:

> Some poor families, if had no *atta* (flour), they would eat only the paste of the *timlas*. They picked the unripe fruit (soft but not sweet) and mixed it with ash to counter the taste and stickiness of the fig milk, boiled it, and then made a paste. Then they would

prepare *roti* and *kapala* and eat with only a little *masala*. They did not like this but sometimes they had no choice.

Indu Devi recounted eating *palyo* and k*apala*, saying, "People used to have no income so people filled their stomachs with black *palyo,* they would just drink it, and *kapala*. They had no other options and even this would not fill their stomachs." Thus some of the traditional dishes and foods were eaten to fill the stomach, were not necessarily enjoyable, and even then it was often not enough.

Women felt that in their youth they had very little choice in their diet due to the lack of options and supply, and that they ate to fill their stomachs, whereas nowadays people eat what they choose to eat and are able to eat for taste. Thus, people's relationship to the traditional diet and feelings toward the traditional diet are different than their feelings towards the present diet. The present diet provides new choices, abundance, and freedom from many time-consuming agricultural and food preparation tasks. Women remembered a sense of constant hunger, compulsion, boredom, and lack of choice while presently people feel they have more choice and can eat for taste. Hasna Devi explained: "Presently people eat different kinds of food and they have a lot of choice. They hear about other types of food and they want to taste it. People take the opportunity to taste new things when possible." The ability to eat what one chooses and to eat what one enjoys, just for the taste, was an important change that many women referred to, because it freed them from *mazburi,* or the helplessness of eating only what they could grow. Also, purchasing food from the market saves women hours of work from cultivation, processing, and preparation tasks. At the same time, though women

appreciated the ability to choose a variety of foods from the market, they also felt that the present diet is not as healthy as the traditional diet, as discussed above.

Though women had many positive perceptions of most of the traditional crops and foods in terms of taste and health, the association with hunger is very strong. The feelings that people have towards the foods and their past experience with them are important and contribute to choices leading to diet change. Since women in this study associated the traditional diet with a sense of helplessness, a lack of choice, and hunger, new foods represent the ability to be satisfied, to choose what one wants to eat, to eat based on the taste of food, and to try new things. Though women see health as a trade off, the desire to move away from the experience of hunger and helplessness may directly impact a woman's choice to move towards an industrial diet, and less invested in preserving the traditional diet.

Women's Diet

Another important aspect of the traditional diet is the fact that women often ate differently, and generally more poorly, than men. Women described ways in which gender roles in the family affected young women's diets in the past. Many women related stories of families reserving what were considered "better" foods such as wheat and rice for male and elder family members, while women, especially younger women, were only given *mandua* and green leaves. Bairavi Devi described an aspect of the way women's diets differed in the family, especially that of young women:

> Young ladies needed more to eat so we gave them more *kapala* and less of other foods. But for children, men, and elders we gave them the better foods, like rice, and less of *kapala*. Sometimes if there were leftovers of good food we would eat it. Otherwise only *kapala* and *depala*.

Thus, in many households women, especially young women, who bore the greatest work burden in the fields, were not given what were considered to be better or tastier foods, but were given less desirable foods that were also associated with a high energy content for work. They were also not given food if there was not enough. Bairavi Devi described this process saying, "the housewife would serve the men and others first and if there was any leftover then she would eat. If there was not enough food the daughter-in-law would not eat."

Women's place in the household hierarchy also depended on age, with older women, especially mothers-in-law, having greater access to more desirable foods and limiting younger women's diets. However, some women also described how this dynamic has changed in the present due to social and infrastructural changes. Focus group participants recalled that as young women they ate fewer vegetables than they do now because their mothers-in-law restricted their consumption, but now they can eat what they want from the market. As in the sense of freedom from hunger and from the repetition of eating only what is available, access to the foods in the market may also be associated with a social and cultural transformation in which young women's diets are no longer restricted.

In addition, because women and men have different work roles, women's diets also differed based on their work schedules and activities. As mentioned above, *mandua* and green leaves were considered high energy foods, appropriate especially for young women who carried out many of the heavy tasks in the field and home. Many women recalled that they would eat very little during the day as they worked, having one or two *rotis* in the morning, sometimes skipping lunch because they were in the fields or forest all day. They also said they

would eat more on the days that they would be doing heavy work and less on days with light work, skipping breakfast on those days. Divya Devi recalled that in summer, if they were not going to do any hard work, they would not eat breakfast. Women would sometimes bring food to the forest while they worked and also sometimes gather wild foods to eat while working, as in the examples given above of bringing *sattu,* or bringing *palak* and gathering *burans* flowers. Older focus group participants in Saari recalled that they would leave home at eight in the morning and stay out of the house until eight at night. They did not eat anything during the day, though in the winter they might bring *roti* with them. Sometimes they would have to travel as far as 20 kilometers in order to gather necessary supplies from the forest, and return this distance carrying heavy loads without having eaten.

Finally women's diet differed due to specific reproductive stages in their lives such as menstruation and pregnancy. Though many women said that no special foods were given during or after pregnancy because there were no special foods to give, Bairavi Devi, who served as a midwife in her community for 60 years, gave some insight into some of the dietary restrictions for pregnant women:

> No special dishes were given to pregnant women but there were some restrictions such as *pinnalu* (taro), and *lal marcha*, not restricted by all families but only in some. For lactating women there were no restricted foods but sometimes the woman ate something, such as *palyo*, and the baby had a problem. If there was a problem with bonding between mother and baby then the greens would become restricted, otherwise not. Some green leaves are restricted for lactating women. She also could not eat new wheat flour, and it is also restricted in present times. People think that if new flour is given to lactating women, there may be a serious problem with the baby such as *sarola* (vomiting and loose motion). Peaches are not restricted but other fruits such as *bedu* and *timla* are. People give lactating mothers *jhangora, mandua* and older wheat and mixed *roti*.

Anjali and Amita Devi described the specific dietary restrictions she knew of for pregnant women, adding also that pregnant women got enough to eat - if there was not enough food others would eat less so she could have enough. Also, families gave milk-rich foods, such as *khir* and suggested that she does not eat much oil and *ghee*. They suggested that she not carry out heavy work. Immediately after delivery they gave her hot ghee to drink, and gave her *halwa* made from wheat flour and *ghee*, and served hot. Their families also followed the practice of restricting pregnant women's consumption of wheat flour from the new crop of wheat. Madhu Devi emphasized the importance of increasing a pregnant woman's *ghee* consumption, which seemed to be a point of disagreement among the interviewees. Some recalled that pregnant women restricted *ghee* consumption, and others recalled that *ghee* consumption was increased. However, there was agreement that increased *ghee* consumption after delivery was important, and that generally families did observe special diets for pregnant women though there were not special foods per se.

Women ate differently in the past due to factors such as gender and power dynamics in the household, gendered work roles, and reproductive health. Women, especially young women and daughters-in-law, were not given what were considered "better" foods and were not presented with choices in their diet. Women also experienced hunger when food supplies were not sufficient for their families, and when they spent entire days working in the field or forest. Young women, however, were given some richer foods and sufficient food during pregnancy. Many of these gendered ways of portioning food have changed. Women now eat what they choose and eat enough, and though they may still serve other family members first, most families have enough to eat so that young women do not have to go hungry. They can

also eat desirable foods such as rice and wheat. These experiences highlight the relationship between women's work and hunger, of working all day with no food or very little food, and the importance of these experiences in shaping the ways women instigate and adjust to changes in the traditional diet. If the traditional diet is associated with hunger, sacrifice for other family members, and a heavy work load, the desire and willingness to accept and even seek out new foods may be stronger.

Section Summary and Discussion

Respondents shared both positive views as well as difficult experiences of the traditional diet. They overwhelmingly felt that the traditional diet is healthier than the current diet which is based more on foods purchased at the market. This is due to the freshness of home-grown food, the healthfulness of the traditional foods themselves, their medicinal properties, and the importance of knowing where one's food comes from. At the same time, women shared many experiences of hunger associated with the traditional diet. Food supplies were insufficient and there were not as many options available as women feel there are today. Many respondents used the word *mazburi* or helplessness to describe their feeling towards eating the traditional foods in the past. Thus, women associated hunger and boredom or lack or choice with some of the traditional foods. Moreover, women's gender roles also impacted their diet through tasks that left women skipping meals, and household hierarchies that required young women to eat after others were fed, or eat only the least desirable foods. These types of hierarchies are weaker in the present, according to some respondents, and, in part, this is due to the greater abundance of food supplies and variety offered by the markets. This may also be due to

broader cultural changes, such as the greater rate of female students attending school, which are shifting gender roles and household dynamics.

Understanding women's experiences and impressions has shed light on the ways in which the traditional diet and agricultural systems may not in fact be an ideal solution to emerging concerns of environmental degradation and cultural loss in the Himalayan region. Though the diet has many potential assets such as health and freshness, the work needed in order to produce the foods is based on women's labor, and the traditional foodways are also associated with experiences of deprivation for women. Thus, the possibility of using the positive attributes of the traditional ways, while ensuring that no subpopulation is burdened through strategies to preserve and conserve traditional systems, must be explored more fully.

C. Structural Conditions Related to Diet Change

A number of broader social and ecological changes have taken place over the course of the respondents' lifetimes that are related to the modifications in the diet described above. This section discusses the four structural conditions described most frequently during the interviews: declining crop productivity, roads and increased access to food markets, agricultural work, and climate change. Other changes which were mentioned, but not developed as deeply during the interviews, are broader socio-cultural shifts such as increased westernization, urbanization, media, and migration. Overall, findings of this study in regards to structural conditions related to diet change point to the need for further research due to the complexity of the topic, especially in light of research in other regions that has shown that structural factors affecting traditional diets are increasingly global (see Kearney 2010 Popkin 2006).

Roads and Market Access

An extremely important change that has taken place in the Himalaya since the 1960's, and that most respondents viewed as significant to food systems change as well almost all other aspects of village life, is the construction of roads. Road development "provides exposure to new techniques, methods, and ideas to modify traditional practices" (Rawat and Sharma 1997: 117), and in mountain areas, is considered critical for communities to have access to the types of development taking place in other parts of India or the world. Rawat and Sharma (1997) found that in the Almora district, just to the south of the Rudraprayag district, health care facilities, government potable water supplies, electricity, telephone lines, and other developments took place closer to the roads, while villages further from the road were not able

to access these facilities as easily. Thus, roads are very significant to the development of the Himalayan communities, bringing both positive and negative aspects of development.

Respondents attributed many major social, environmental and economic changes related to the construction of roads, especially the routes to Kedarnath and Badrinath, two major pilgrimage sites that bring travelers through Uttarakhand. All village sites in this study were along these routes (see Figure 3.5). Divya Devi's husband related his perspective on one of the social impacts of the roads:

> People traveled on foot and our village is on route from Kedarnath to Badrinath. During the summer season the route is well traveled. The road was built in 1962 and after that we had more access to the market. People became more aware about the rest of the world. But communication to others in the village became less. They used to travel by foot so they used to talk to each other a lot. But with increased communication to the outside world communication to other villagers became less.

Roads have allowed villagers to communicate with many more people from outside the villages, but according to this respondent, they have altered the way villagers communicate with each other. Bairavi Devi discussed the difficulty of transportation in the past, recalling that people had to walk everywhere and were unable to communicate using phones as they do today, demonstrating some of the positive impacts of the roads. She continued by describing ways in which social relations and communication have changed greatly over time:

> In those days people did not have much time to socialize; only old people could talk to friends etc. But younger generations could only talk when they went to the woods to collect fuel. Then they could share their problems. Some programs were run by villages, like *Ram Lila*, drama, etc. At that time people could recreate. But these programs were held only when people did not have too much work in their field, or when animals came down from pasture before winter. They planned events for those times. In those times people had attachment to other family members but could not spend the time with them because they were always working. Presently people do not have good attachment between two families but they sit and talk.

Though she did not specifically refer to roads as the cause of this social change, she described a change in the way people socialize in more recent years, confirming that village has life has transformed significantly since the time of her youth, and that these changes are related to changes in transportation and communication.

Other aspects of life such as access to western medicine have changed due to road construction. Divya Devi's husband described the direct impacts of the roads on the local health system:

> Before the road was built if someone were to get injured no hospitals were available. There were one or two hospitals but they were too far so people could not go there. So they cured themselves at home. Some local *vadiyars* (traditional healers) were there who prepared medicines from local *jari-buti* (local medicinal plants). If someone were to break an arm or leg they would make local plaster. After the road was built people had better access to the health system. The transportation was much less developed in the past. People had no money for travel. So they went everywhere on foot. But presently every house has a vehicle.

Respondents also felt that roads have changed the nature of commerce. Previously, villagers built seasonal shops, assembled during the most popular pilgrimage months, June and July, to earn an income from travelers who came by foot. With the construction of paved roads, larger markets, restaurants and guest houses have taken over with their ability to provide more goods and services than the smaller seasonal shops. These newer businesses, more and more owned by urban populations, have grown in size and quantity with the ability to transport large quantities of diverse goods into the hills.

Roads have had a tremendous impact on all aspects of life in the hills, and they have also allowed development of and access to the markets which have directly impacted the hill diet. Divya Devi's husband stated that, "After the road was built, bigger shops were built close to the

road so people could purchase daily needs… So after the road the food system also changed." His contributions to the discussion on roads is likely related to the fact that he runs a small roadside tea stall and shop, and has lived in the same place for his entire life. Thus, he has literally watched the construction of the road through his village. As a small business owner, he has both positive and negative associations with the changes the paved roads bring, one of the major changes being the increased access to the food markets.

All respondents emphasized the lack of access to outside food supplies in the past, and the current dependence on those purchased supplies as a major change over the course of their lifetimes. Women did not associate the dependence on the market as entirely positive or negative – many of them appreciated the variety, the ability to purchase grain and not have to process it themselves, and the availability of food when their yields were insufficient. Bairavi Devi described some of the impacts of the markets she had noticed on the traditional diet, particularly the variety and the ability to supplement cultivated food stocks:

> These days people have money and they can buy whatever they want. But in the past people did not have any money or less money, so they could not buy anything. Others may have had some money but there was no market. So our diet was based on local resources. Sometimes we bought *koda* (finger millet) and *jhangora* (barnyard millet) from another family; other times we bartered one grain for another. Some families did not have milk and ghee so they bartered their grain for dairy products…In those days we depended only on our fields so however much we grew we had to manage for the whole year. But now if we grow a small amount we can buy food from the market.

Though the markets in the hills are relatively small compared to urban markets in Delhi and major cities, for villagers who have lived in the mountains for their entire lives, the small local markets as well as the larger markets found 12 kilometers away in Ukhimath, contain an abundance of new products. Before the paved roads, there were no markets at all, aside from

seasonal shops for pilgrims, and most villagers did not have any access to income to purchase from those seasonal shops. Women and families now have access to cash to purchase food in the market due to the increasing rates of male outmigration in the Himalayan region, where one or more male family members in many families move to urban centers in order to work and send income home (Rasmussen and Parvez 2002) . The market is not only convenient, but it gives a sense of choice and freedom from the repetitive experience of eating only what one could grow, as Gauri Devi commented: "When I was little people ate the same thing every day. Because there were no choices, no market. Today there are eggs, maggi, other types of foods." Thus, most respondents emphasized the transition from having been dependent only on their fields to now purchasing most of their basic dietary needs from the market. This access to the market has decreased hunger, has given women a sense of greater choice, and it has also allowed for and contributed to the major shifts in the traditional diet discussed in the first section above.

For example, as described in Section A, green leaves were an extremely important part of the traditional diet. However, respondents reported that they very rarely gather green leaves anymore, in large part due to the fact that vegetables are available all year round at the market, and it is easier to purchase vegetables than to gather and clean small leaves. Also, due to the availability of white rice, wheat flour, and pulses at the market, most respondents said they eat much less of the traditional rice varieties, traditional millets, and pulses. They used to use little cooking oil, and the oils they used were grown and pounded at home. Now, however, they use refined oil regularly that is purchased at market. Similarly, *masalas* (spices) were previously home grown and now they are often purchased.

People's changing perception of taste is also an important factor in the diet change. Foods which were not previously available, such as packaged noodles, soda, and even refined wheat flour, are now considered tasty, especially by the younger generation. Traditional foods are considered less tasty, and are eaten less often. For example, focus group participants in Kandara village stated that the younger generation does not like the taste of *mandua* (finger millet), and that wheat is more versatile and can be used to prepare more items, such as biscuits. This is an item that is not part of the traditional hill diet, but can be purchased in the markets. These changing tastes may also be related to urbanization and westernization brought about not only by roads, but by the presence of tourists, family members who migrate to large cities to work and then return to the villages, and by the presence of television in many homes. It is possible that contact with urban and/or western culture has increased the level of shame in regards to traditional foods, and held store-bought foods in a more desirable light. This reaction has been noted in studies of many indigenous peoples, including the Inuit of Canada (Mead et al. 2010). In addition, many of these foods are associated with times of hunger, and were eaten because nothing else was available, which is another reason that may make them less desirable.

As discussed above, most respondents felt that the traditional foods are healthier than store-bought foods. Yet, they also described the ease of availability of food supplies in the market, facilitated by the construction of roads, as a major factor affecting the change in the hill diet. Thus, roads and access to the market have allowed villagers to fill in the gaps in their diet and avoid the hunger they experienced in the past, to access new tastes, and it has also contributed to a shift away from the traditional diet. The markets do not provide traditional

crops, and they provide a source of less healthy food, yet the traditional diet failed to provide adequate amounts of food, making the markets critical for alleviating hunger. Women repeatedly commented on the lack of availability of local varieties of pulses in the market, yet they also gain from being able to purchase foods rather than rely only on what they can cultivate. These tradeoffs present challenges for maintaining health and for transmitting traditional knowledge, while at the same time ensuring adequate food supplies in the hill region.

Decrease in Productivity

Many respondents noted that the productivity of their farms has been decreasing over the course of their lifetimes. Focus group participants in Saari village estimated that their current production gives enough food for three to six months of the year, whereas in the past they grew enough to sustain their families for at least eight months. Due to this decrease in productivity, they have become increasingly in need of external food supplies, which have become more easily available in the local markets. Focus group participants in Saari gave soil erosion as a possible explanation for the yield decrease they have witnessed. They explained that though the crop types have remained the same, the quantity is less, possibly because they get much more rain during rainy seasons now than they used to, leading to top soil erosion. Maikhuri et al. (2001) also found that crop yields in Garhwal have been decreasing over the last three to four decades due to declining soil fertility and increased soil erosion. This fertility has declined due to shrinking access to forest products that are applied to fields (such as leaf litter),

as well as changing cropping patterns that have increased soil erosion on the hillsides. Rao and Pant (2001) similarly found that access to the forest is critical for traditional agricultural systems in the Himalaya, yet forest cover has decreased drastically over the last 50 years. Forest cover also prevents soil erosion, so a decrease in forest cover has also contributed to soil erosion, ultimately affecting crop yields. Also, as male outmigration has increased, labor demands on remaining female family members have increased, possibly contributing to a decrease in productivity.

While traveling through the Chopta region, a tourist area close to the first group of villages in which I conducted field work, I had the opportunity to visit a preserved forest area. My guide explained that due to the forest preservation boundaries and rules set by the federal government as well as local institutions, local people have lost some access to fuel and fodder resources from the forest, as well as land for grazing, and for expanding agricultural fields. The decrease in the number of cattle held by village families due to a loss of grazing space has led to a decrease in the amount of farmyard manure. Manure from cattle is the most important input to increase soil fertility aside from leaf litter. Thus, forest preserves have also contributed in part to the decrease in crop productivity. Moreover, as more space has been created for wild animals through the forest preserves, their populations have increased, and they regularly enter fields and take crops. For example, on a daily basis, the dog who lived at the home of my host family would patrol the boundaries of the agricultural fields to scare off the wild langur, a species of monkey that entered the family's fields regularly and ate crops.

Forest management policy in India and the Indian Himalaya has a long and complex history which I will touch on briefly here. Before the British arrived in India, villages managed their land themselves through community institutions (Sarin 2001). Colonial rule brought a series of forest management policies in which communal lands and "uncultivated" lands including forests became property of the central government under British rule. These policies restricted forest access by local people, leading ultimately to decades of struggle between the British rule and mountain communities over forest access rights (Sarin 2001). The Indian government (after India gained independence in 1947) continued with the centralized management of forests which restricted access to locals, and mountain communities continued to protest. The famous Chipko movement, in which mountain communities organized to resist the felling of their forests and to resist federal forest management policies, came to epitomize the decades of struggle of Himalayan communities to protect their forests (Guha 1989). In recent years, the federal government has increasingly handed forest management responsibilities over to community forestry institutions (CFI) made up of local people, whose main function is to protect the forests through the formulation and enforcement of forest rules (Agarwal 2010). These rules pertain to such activities as fuel and fodder collection, and the gathering of other forest produce. Though the CFIs ideally allow community members to develop their own rules, community members can be restricted from gathering needed materials due to the decision of the CFI to protect the resource at a particular time (Agarwal 2010). These rules, combined with decreased forest cover and federal and state forest preserves, can limit villagers' access to the forest, and can also affect crop productivity.

Focus group participants in both groups in Kandara gave an explanation for the decrease in crop yield that they have also experienced, which is related to a decrease in the amount of land available for each family to cultivate. They felt that their fields had become less productive because as the population has increased, the land has become more and more divided, leaving less land for each family unit. Demographics play an important role in the management of all natural resources, as Rao and Pant (2001) found in their study of forest cover in the central Himalaya. They found that the population density in the region increased by almost 20% between 1963 and 1996 (2001). This increase in population density and the cultural practice of dividing land between the sons of a family is another contributing factor in the decreasing crop yield for family units, leading families to seek out other food supplies such as the local markets. The reliance on foods purchased at the market ultimately contributes to a change in diet.

Due to reasons such as forest management policies, declining soil fertility and soil erosion, and decreasing farm size for family units, respondents shared that they have experienced decreased crop productivity, which has in part led them to depend more heavily on purchased food supplies from the market. This shift has contributed in part to the diet change in the hills.

Work

Another important factor affecting diet change that emerged during the interviews is the actual agricultural work involved in the production of traditional foods – the amount of work involved in cultivating and processing traditional grain, and the overall desire to work in the fields. Generally, women do the majority of agricultural work and food preparation in the middle hills (Agarwal 2002). Work burdens on women have increased in recent years due to

increasing rates of male outmigration (Rasmussen and Parvez 2002). Though male outmigration in the Himalayan region has been taking place since the 1800's (Gururani 2002), it has increased to rates as high as 40% of the male population in the mountainous regions of South Asia (Rasmussen and Parvez 2002). In the interviews and focus groups, the ways in which migration has affected women's experience of agricultural labor were not emphasized by the respondents, though based on informal conversations with members of the NGO I worked with as well as other researchers in the region, and on previous studies of migration patterns in the area, it is a significant factor affecting the increased work burden on women.

Anjali and Amita Devi emphasized the challenge of farming in the hills due to the steep inclines, the need for high human labor input as well as cattle, and the low productivity of the hill farming. Eka and Eesha Devi, both in their 70's, were working in their field with several younger women, in their 20's and 30's, when my guide and I arrived to speak with them. They emphasized that the land is not productive, and though they work many hours every day, they get little in return. They also felt that as women they have no other options for livelihood or other activities to become involved in, so they continue to farm even though it is not very productive. My guide added that families are looked down upon if they leave their fields fallow, which some families do because they no longer rely on crops from their fields to survive, so some women continue farming even though the return can be quite minimal for the amount of work they invest.

The lack of other economic opportunities for mountain communities is due to the relative lack of industry in the region, and affects men and women both. Bairavi Devi recalled

that people did not have a choice but to cultivate their fields and engage in agricultural work, but that in the present people are "growing crops without interest," yet at the same time there are minimal opportunities to work outside the home. This is the case not only for women, but employment for men outside the home, which is highly valued and necessary now that families need cash income to purchase food supplies and other necessities, is difficult to find. One of my first evenings in the villages I visited a roadside tea stall with my guide, just before sunset. I noticed that the only people working in the few shops and tea stalls clustered by the road were middle-aged men, while there were several young men playing games, drinking tea, and socializing. Many are unable to find employment outside of their homes. Meanwhile, women of all ages were carrying baskets of fodder and heading home to feed the cattle and prepare the evening meal. Culturally, collecting fodder for cattle, agricultural tasks, and food preparation are women's tasks (Agarwal 2002). Though men may not be employed outside of the home, according to my guide, it is not culturally acceptable for men to participate in "women's work." During the final focus group in Sari village, the woman who hosted us in her home pointed to her son who had a Master's degree, but was unable to find work, so he stayed at home. A younger woman in her 30's, in an informal conversation, shared that she had completed her high school education as well as her two years of higher education, and had enjoyed working outside the home for the few years she had the opportunity to. However, due to changes in her family life, she was not able to continue. After that, she stayed home and her daily routine became that of the typical hill woman's work day as described above. She found this unsatisfying and wished for some opportunity to work in other capacities as well as earn an income of her own.

Aside from general feelings of disinterest in agricultural work, and the intense challenge of the work itself, women also felt that certain types of traditional crops required work that they no longer needed or wanted to do because they no longer depended on their fields for sustenance. For example, most women, though they listed it as one of the healthiest and tastiest foods, do not cultivate *jhangora* (barnyard millet) for human consumption anymore. This is directly related to the fact that *jhangora* requires more pounding to remove the seed from its husk than any other grain. Thus currently *jhangora* is only cultivated for fodder for the cattle by most respondents. Bairavi Devi explained further why certain *mota anaz* (traditional varieties of grain) were no longer cultivated:

> Some seeds are left out. Some types of rice, wheat, etc we do not like because these varieties are more difficult to separate grain from husk. ..Some wheats were very long, not that tasty, so people stopped growing it. These *mota anaz* are more productive but people left it because they are difficult to work with.

Madhu Devi reported that her family eats more vegetables from the market such as okra and eggplant, and fewer green leaves, because the green leaves are too much labor. A great amount of time is required to gather enough green leaves to prepare a dish that would feed the family. On the other hand, most women felt that rice, no matter the variety, is more labor intensive to cultivate than *mandua* (finger millet) because rice fields require weeding at three separate times per season, while *mandua* only requires one. However, the difficulty of threshing and the work required to gather or process certain traditional foods are reasons why they are no longer cultivated, and ultimately occasionally eaten, or no longer eaten at all.

During my field work, I observed that hill women, especially younger women, worked constantly – they were gathering fodder early in the morning, preparing meals throughout the

day, working in the fields, and again in the evening gathering fodder for the cattle. Though most women, especially younger women, agreed that this was the case, many of the elder women said that they feel women, in general, work less than in the past. It is difficult to know whether this is because older women do not work as heavily or as much as younger women in general, or whether the actual time that women work has deceased. Oma Devi recalled that in her youth she felt like life was only work - washing clothes and dishes, cleaning the animal shed, giving food to animals. She said she felt like a machine – no rest, no stopping. She would pound the grain by hand, make *roti*, and thresh rice. She would make ghee and buttermilk. She felt that these days life is better for women – more freedom, more rest, and less work. She shared that she personally has less work in the fields now because in her family men earn the money and women shop for food, leaving women in her family with less agricultural work. However, she is in her 60's, so her experience of the household workload may be different than younger women in the household who are responsible for more daily tasks. However, in general, access to the market has relieved many women of the pressure to cultivate all of their families' food needs.

The challenge of agricultural work in the hills, the types of work involved in cultivating, processing, and preparing the traditional foods, and the relationship women have to agricultural work has impacted the hill diet. Overall women reported less interest in farming than in previous years, related to the fact that their families currently depend less on their fields. Decreasing productivity, increased education, and minimal opportunities to work outside the home have contributed to a feeling of frustration with farming and a decreased desire to carry out agricultural work. This change in attitude towards farming is related to the

increased use of market products as well. Finally, some traditional crops require greater amounts of work to process which has caused women to stop growing some of them, and ultimately dropped these foods from the hill diet. Thus, women's experiences with agricultural work, as well as the challenges of the work itself, are critical to take into consideration, especially for research and advocacy which promotes the conservation of traditional agricultural systems.

Climate Change

In recent years there has been increasing recognition of global climate change in scientific research and popular conversation (Mall et al. 2006). Due to the importance of agriculture in the Indian economy as well as in the livelihood of millions of small-holder farmers, research on climate change in India has emphasized the impacts on crop production and food security (Mall et al. 2006). The increasing unpredictability of the weather and changes in temperature and rainfall have caused researchers and policy makers to begin to focus on the many ways that the impacts of climate change on agricultural production in India could be mitigated, such as the development of new crops, and the importance of understanding the knowledge and perceptions of small-holder farmers themselves in regards to climate change (Chaudhary and Bawa 2011). In a study of villagers in 250 different Himalayan households, Chaudhary and Bawa found that more than 60% of respondents experienced a change in the onset of monsoon, as well as warmer overall temperatures. Respondents also provided

detailed information on the changes in bloom time of specific plants, and the appearance of new agricultural pests, all of which they associated with climate change (2011).

Though detailed data on the perceptions and impacts of climate change were not collected in this study, general perceptions of warming temperatures emerged in most of the interviews. Most respondents in this study felt that the climate in the hills is changing and becoming warmer, and described how several aspects of life, including agriculture, diet, and clothing, have changed due to warmer temperatures. Many described the change in traditional clothing - how people all used to wear woolen clothing year round, but no longer do. Indu Devi recalled that in the past, "We didn't have different clothing for different seasons. We always wore local wool. Wool acted as an insulation. If we got wet we wouldn't get cold." However, many respondents felt that it is now too warm in the summer to do so. I observed, however, that older women generally still wear traditional woolen clothing, even in the summer, but younger women wore *saris* (traditional Indian dress made from cotton, silk, or polyester, often very light fabric) or *salvar kameez* (long shirt over a loose fitting pant, also made with light fabric). So it is also possible that younger generations do not want to wear the traditional woolen dress, and that their choice of clothing is not based on temperature. It is also possible that though they are too warm in the summer months, older generations are uncomfortable or unwilling to begin wearing *saris* or *salvar kameez.*

Several respondents also attributed certain changes in the hill diet to a warming climate. For example, in the traditional health system that was the primary health system until recently in the hills, foods are described as either heating or cooling. Narenderji, the traditional healer,

described an entire system in which traditional foods and preparations are categorized by the way they affect the body in terms of temperature (hot/heating or cold/cooling foods). He reported that, "Elders decided or advised which foods were hot and which were cold. People ate grains and pulses all year round," while other foods were restricted to specific seasons. Furthermore, during the monthly festival of *Tyohar,* specific foods were chosen that would prepare the body for the current season, such as heating foods in January. He added though, that, "the hills used to be a cooler climate so there was no problem," but presently certain traditional foods make peoples' bodies feel too hot. Some respondents described how several green leaves - *marcha, cholai*, and *kandali* - which were eaten very regularly in the past, are no longer eaten, in part, due to their excessive heating effect on the body, attributed to a warming hill climate. Lalita Devi described allergic reactions to *mandua* that she had not experienced previously due to what she perceived as excessive heat in the body after eating them. Thus, in connection to the experience of a warming climate, several respondents described the excessive heat associated with certain traditional foods, especially green leaves. This excessive heat is one of several reasons why green leaves are no longer preferred foods in the diet, pointing to a possible link between climate change and a shift away from the traditional diet.

Aside from the experience of certain traditional foods affecting the body differently due to perceived changes in the climate, some respondents described difficulty in growing traditional varieties, which they associated with a changing climate. Eka Devi reported that she used to grow many different varieties of pumpkins but no longer is able to because the climate is different, and they don't grow as well. She mentioned two varieties, *gol armyoth* and *twama armyoth*, which she no longer cultivates due to the difficulty associated with changing weather,

such as hailstorms in which the crop gets ruined. She has also noticed increased insect problems she does not remember having affected her crops in previous seasons. Chaudhary and Bawa documented similar accounts in their interviews with villagers in Himalayan communities, reporting that 54% of respondents in their study had observed new pests due to a warmer climate, especially villagers living in higher altitudes (2011). These accounts show that a changing climate could be one factor that would affect the ability of people to maintain their traditional agricultural practices, and, therefore, their traditional diet. More research in the study area is critical to identify traditional varieties that are able to withstand the changes in climate that local people are experiencing.

Section Summary and Discussion

Several structural conditions were described during interviews that are related to changes in the hill diet. The major conditions that emerged were: decreasing crop productivity; roads and access to the market; agricultural work; and climate change. Declining soil fertility, soil erosion, forest policy, education, ability to find employment, warmer temperatures, and the construction of roads are all external factors that are related to the changes in diet described in the first section. These factors are not directly causal, but are part of the broader context in which personal food decisions are made, what is available to choose from, and what is possible to even grow. Women and villagers as a whole also exert agency in the process of diet change. Thus, an understanding of systemic changes as well as individual behavior can lead to a fuller understanding of the context in which traditional foods are becoming less a part of the hill diet.

6. CONCLUSION

This study has three main conclusions in regards to women's experience of diet change in Uttarakhand, corresponding with the three research questions raised in the Introduction. The first question sought to understand the ways in which the hill diet has changed through the experience of elder women. The results of the study show that respondents are experiencing transition in their diet, away from traditional crops and foods, and towards an increasing reliance on food purchased at the local market and produced by the industrial food system. However, the results are not clear as to the extent of consequences due to this transition, such as diet-related diseases, or food sovereignty. Respondents, however, generally reported that they do generally feel that their health has declined as the diet has changed, aspects of the ecosystem are degrading, significant changes in agricultural practice are taking place, food-related knowledge is not being passed down to new generations, and they are becoming more dependent on an industrialized and globalized food supply characterized by the concentration of capital in a small number of entities. This suggests that Himalayan communities may be at greater risk of negative consequences if the trend towards a dependence on industrial and packaged foods, foods higher in sugar, and a loss of traditional agricultural and food knowledge continues.

The second research question sought to understand women's experiences and views of the traditional diet. This study has found that the associations of the traditional diet with experiences of hunger and a lack of choice contribute directly to decisions women make to

purchase food supplies from the market. Gendered experiences, such as the restrictions from "better" foods women faced in the past, may also contribute to a sense of freedom and choice when women can purchase desired food supplies from the market, and eat what they choose at home (this may also be related to cultural changes in gender roles). Though respondents feel that they may be losing the health benefits of the traditional diet, the ability to purchase these supplies has allowed respondents to avoid previous experiences of hunger, has allowed women to eat desired foods, gives respondents the sense of choice in their diet, and may be seen as a tradeoff they are willing to make. Given that the traditional diet is associated with a sense of deprivation for women, and that the traditional agricultural system is based primarily on women's labor, bringing women's experiences to the center of any initiative to preserve the traditional diet is critical in moving towards a system that does not disproportionately burden women. As hill communities, researchers, and policy makers develop and plan for the future of hill agricultural and food systems, the protection of traditional knowledge and of the environment must not take precedence over the improvement of women's lives.

Finally, the third research question sought to explore how changing structural conditions have affected diet change in the hills through the experience of elder women. This study has found that structural factors play a role in a community's ability to access their traditional foods, and may also play a role in affecting perceptions of food in general. The construction of roads has affected Himalayan communities in many ways. Access to food markets has been critical for mountain communities to be able to purchase new foods which are replacing traditional foods to a significant degree, and this access has been possible through the construction of roads. Other factors, such as the degradation of soils, related to local forest

management, agricultural work, and climate change may also affect the respondents' ability or desire to cultivate the traditional crops, which in turn makes these crops less available. People then become more dependent on purchased food supplies and ultimately consume less of their traditional foods on a regular basis.

The diet of the respondents has changed in numerous and significant ways. In general, almost all aspects of the diet - greens, grains, spices, pulses, etc. - have changed from a complete reliance on traditional crops to an increasing reliance on purchased food supplies. In the past, respondents relied heavily on greens that were gathered. They were eaten in at least one to two meals throughout the day, and in every season a different variety of greens were available. They were an extremely important part of the diet prepared as a side dish eaten with a grain, cooked with grains as a main dish, or eaten raw. Greens were used to fill the stomach when other foods were not available and were considered healthy and high in energy. Though families still eat some greens, many of the varieties, especially the ones which are gathered from pastures or cleared land, are not collected and/or eaten anymore due to a number of reasons, including the work involved to gather and prepare them, and the association of these foods as foods eaten during times of hunger. However, the loss of these greens from the diet is a loss of a rich nutrient source. Gathered greens are considered an extremely important source of micronutrients and minerals, and are also able to be gathered without significant ecological disruption through agricultural activity (Mnzava et al. 1999; Narayanan and Kumar 2007). Though it is not clear whether the respondents are experiencing health problems due to a decrease in the consumption of greens, it is possible that people will feel long-term effects. Moreover, the minimal input required to grow the greens, as they basically grow on their own,

means that this food source has minimal impacts on the environment. Thus, the loss of this food source is also a loss of an ecologically sustainable food practice. At the same time, the labor for gathering these greens has traditionally fallen with women. Thus, in evaluating the importance of green leaves in the diet, gendered labor roles must be taken in to account.

The respondents described how the hill diet in the past also depended on a number of traditional grains and their varieties, broadly referred to as *mota anaz* by Garhwalis, including *mandua* (also called *koda)*, *jhangora* and *koni* (finger, barnyard, and foxtail millets); *marcha* (amaranth); *jao* (barley); *dhan* or *sati* (rice), and *gehun* (wheat). They were eaten, traded with other families, stored for long term food supply, and used for seed for the following season. The *mota anaz* were used for a number of traditional dishes and eaten at each meal, though when grain supply was low families experienced hunger and depended on green leaves and dairy products since no markets were available. Though all respondents said they continue to cultivate a number of traditional varieties, families no longer depend on the *mota anaz* for their yearly food supply, and have transitioned to a diet mainly based on wheat flour and rice purchased from the market, which is grown industrially in the plains of India. This seems to be the most significant transition in the diet of the respondents, in that a complete reliance on traditional grains is increasingly replaced by a complete reliance on rice and wheat. This transition has allowed respondents to avoid the significant experiences of hunger in the past, yet rice and wheat are also seen as less healthy, and the transition has contributed to a significant decrease in the consumption of traditional grains.

Long term consumption of white rice and wheat, to the exclusion of other whole grains, is connected to diet-related diseases in other parts of India (Kataki 2002). Thus this trend may indicate future health risk for hill communities. Though hill communities are still much more physically active than urban dwellers, it is not clear how this significant change in diet could affect people's health in the long term. Also, the traditional grains have been developed over the course of hundreds of years and aside from being high in nutrient content, also have medicinal properties. This knowledge could be useful to the hill communities, especially those who have less access to medical clinics. The grains represent hundreds of years of knowledge in the selection, storage, and preparation of the grains as an agricultural product and as food. The loss of these grains represents not only potential health impacts, but also a significant loss of cultural dishes prepared using these grains, and of knowledge. At the same time, the presence of these grains in the hill diet has relied on women's work, and has not provided adequate supplies of food, which has greatly impacted women's diets. Thus, simply considering traditional grains as an asset in the diet does not tell the entire story.

Another aspect of the diet that respondents report some change to is in the consumption of fruits and vegetables. Women recalled that their families only had access to the vegetables and fruits they grew in their gardens, which varied with the seasons. During the rainy season the yield was the greatest, but at other times of the year families would collect greens, wild foods, or not eat vegetables at all, using salt, onions, *ghee* and other elements of the diet to eat with *roti*. Some fruits, such as figs and peaches, still grow but are not used in the regular diet anymore; others were gathered wild and are no longer collected; and still others are newer to the region such as apples and *malta*, a type of orange. Some varieties of

vegetables are simply not found anymore because they are not grown or they cannot grow due to climatic changes. Families have stopped eating as many green leaves as their access to other more desirable market vegetables has increased. The results indicate an increase in vegetable consumption on the whole, which is generally considered to be healthy, though many women felt that homegrown fruits and vegetables taste much better than those from the market. Vegetable consumption and cultivation, however, seems to have changed less than greens, grains, and pulses. It is not clear from this study if respondents are losing a significant amount of traditional vegetable varieties, and therefore agricultural knowledge, due to an increasing reliance on store-bought vegetables. This aspect of the diet may represent a positive transition for the respondents in that families are able to consume fruits and vegetables all year, women are not limited in vegetable consumption, and many culturally appropriate types of vegetables are available for purchase.

The traditional hill diet also includes many types of locally grown pulses (lentils and beans) with a diverse array of different varieties. Pulses are generally cooked as a main dish during the afternoon meal, as a stew, and eaten with rice or *roti*. Though families continue to grow and eat these local pulses, the quantity grown and eaten has decreased, and families now increasingly purchase pulses from the market. The market does not carry local varieties of pulses, and women feel that the market pulses do not have the taste of the locally grown crop or the pulse varieties from the past. Also, some varieties of local pulses are no longer found in their fields, and dishes were prepared in the past that were based on these local varieties that are no longer eaten regularly, though many are remembered fondly. Pulses are an important source of protein in most Indian diets, and the fact that respondents are able to purchase

pulses from the market indicates that they have access to a protein source. However, the fact that traditional varieties that are no longer cultivated and cannot be purchased at the market could indicate a loss of traditional agricultural knowledge, and indicates a structural barrier to accessing traditional foods. A decrease in the preparation of traditional pulse-based dishes could lead to a loss of Garhwali cultural cuisine, and as with other aspects of the diet, an increased reliance on purchased supplies could lead to a loss of food sovereignty for hill communities. How to maintain this critical knowledge and sovereignty without overburdening women, or any other population, and whether these are indeed priorities for the villagers, is important to understand more fully.

All respondents said that traditionally their families had a large number of cattle and therefore plenty of dairy products in their diet such as *dudh* (milk), butter, *ghee* (clarified butter), *chanch* (buttermilk) and *dahi* (yogurt). These products were used to prepare a wide variety of main dishes and sweet dishes, and *ghee* was used for frying. Presently, due to a number of changes socially and environmentally, families have fewer cattle and eat less dairy products. Dairy products, though less linked to survival today, are still considered healthy and a very important part of the diet. However, respondents indicated a decrease in the consumption of dairy products, which is quite different than India as a whole and most transition diets globally that are moving towards an increasing consumption of animal products. The health impacts of this transition are not clear from this study, and certainly require further inquiry.

Another related and significant situation is the impact of forest management on the community's ability to maintain cattle, and the impact of soil fertility due to a decrease in cattle, which in turn affects crop productivity. Though many of the families I visited during my fieldwork were stall feeding their cattle, which could lead to easier access to the manure (not having to collect it over wide pasture or forest areas), the total decrease in the number of cattle has led to an overall decrease in cow manure. Ultimately, the ability of hill communities to grow the crops they prefer, to maintain traditional varieties, and to produce yields that can sustain them, depends in great part on soil fertility. Thus, the transition in regards to dairy products represents a greater and on-going tension in land use in the hills that ultimately impacts the viability of traditional agricultural systems.

Women recalled that they gathered many types of wild foods on a regular basis to supplement the family's diet. Many fruits and other types of plants, including medicinal plants, were gathered from the forest while women worked. Though people occasionally gather produce from the forest in the present, most families do not gather either food or medicine regularly from the forest anymore for a number of reasons including changes to forest regulations, access to the market to purchase food supplies, and cultural shifts in which gathering wild foods is associated with times of hunger. From an ecological standpoint, it may be positive that respondents are no longer gathering as much edible or medicinal plant material from the forests – this may allow forests to regenerate and be preserved. However, in terms of health, the diversity that wild food adds to a diet is incredibly valuable (Kuhnlein and Receveur 1996). Though markets may carry a wide selection of packaged foods that were not previously available, it is unlikely that processed foods would be as beneficial to one's health as wild foods,

gathered fresh from the forest. Respondents also shared a perception of fresh food as healthier, yet they also valued the convenience of purchasing items from the market. The extent to which a community's health is compromised by the lack of wild foods is not clear based on the results of this study. However, the loss of knowledge is certainly problematic. Knowledge of edible plants is passed down from generation to generation, but if one generation stops collecting and eating those plants, the next generations may lose the centuries of trial and error in discovering how to identify, collect, and prepare these valuable resources.

Traditionally, oil was not used very often in hill diets due to the difficulty in processing oil seed by hand and the abundance of *ghee.* Now families use more oil in their cooking, such as refined sunflower or soy bean oils, because it is easily available at the market. Oil seed plants also were part of mixed planting groups, and these traditional planting systems are becoming less common. The increase in refined oil consumption may lead to long-term health consequences, and the loss of knowledge of mixed plantings incorporating oil seed plants as well as the plant varieties themselves may be a negative consequence of this diet shift.

Previously, families drank water, milk, buttermilk, home-made juice and herbals teas. Presently, though families still drink water, milk, buttermilk and some home-made juice, *chai*, sodas and store bought juice have become a greater part of the diet and herbal teas have become much less common. One significant concern in regards to the increase in *chai,* soft drink, and juice consumption is the greater level of sugar intake. It is possible that over time, respondents will experience diet-related diseases associated with high sugar consumption such as diabetes. Though the exact amount of sugar that the respondents consume was not

gathered in this study, the trend may indicate the importance in assessing the quantity of sugar hill communities consume, and the potential risks for diet-related diseases. Moreover, herbal drinks and home-made juice may have medicinal properties that soft drinks and store-bought juices do not. It is likely that many of the traditional herbal preparations and juices were not only used to refresh and as enjoyment, but were also used to either treat or prevent illness. The loss of this knowledge and the health benefits of this knowledge may be a negative consequence of this diet shift.

Finally, families still grow some *masalas,* but often purchase powders from the market, and even have access to some varieties which they did not have in the past, such as boxed spice mixes. However, many respondents feel the store bought *masalas* do not have the same or as good of a taste as those home-grown and pounded on the *silabata* (large rock used for grinding). Though spices do have some medicinal properties, it is not clear how harmful to respondents' health it is to transition to store-bought spices, but it is possible that the use of store-bought spices could eventually make knowledge of the cultivation and preparation of spices at home obsolete. Thus, loss of knowledge could be a concern in regards to this change in the diet.

Certain aspects of the diet have changed more than others – the substitution of purchased wheat and rice for the wide variety of traditional grains is quite dramatic, while the types of vegetables eaten have not changed as significantly. However, the general trend for the aspects of the diet discussed above is away from traditional varieties and homegrown foods, and an increasing reliance on foods purchased at market. *Masalas,* which were grown and

processed at home traditionally, are now purchased in powder form by many families; soft drinks and packaged noodles are purchased at the market; and *ghee* made from families' cattle has been replaced by store-bought refined vegetable oils. Many of these trends reflect some of the patterns of diet change worldwide that are leading to increasing rates of diet-related disorders. They also reflect a departure from traditional systems based on local ecological knowledge to an increasing reliance on "expert" knowledge in the form of industrially farmed rice and wheat and packaged foods. Both of these trends could lead to negative consequences for hill communities in terms of health, cultural preservation, knowledge, and sovereignty (in this case the ability to provide for and control one's own food supply). At the same time, the cultivation and preparation of the traditional foods relied heavily on women's work, while women simultaneously experienced significant levels of hunger on this diet. The challenge of developing a vision of an ecologically and socially sustainable diet, balancing these often contradictory ideas, is something that requires input from a diversity of community members, including women and men villagers as well as the scientific community.

Returning to Popkin's five patterns of the nutrition transition, the respondents have described a transition that may place their communities moving from pattern two, "famine," to pattern three, "receding famine" (see Table 2.1). Pattern two seems to describe the experiences women recalled during the interviews – hunger was common, women suffered more from deficiencies, cereals were predominant (though arguably the diet was very diverse due to the use of gathered greens, wild foods, and the high diversity of traditional grain and pulse varieties), and the landscape was completely rural. In the respondents' descriptions of the present, many aspects of pattern three reflect their experience. Pattern three matches

with some of the findings of this study for the present diet such as increased fruit and vegetable consumption, cooking technology such as clay stoves, increased population, and some migration to urban areas, as well as some urbanization in the mountains themselves (roads, electricity, telephones, etc.). However, the results of this study indicate that the transition taking place in the respondents' experience does not reflect completely the descriptions of pattern three societies. For example, pattern three indicates an increase in animal protein, but the respondents described a decrease in the consumption of dairy products, and meat was not actually mentioned, though it is possible that meat is eaten occasionally. Secondly, the farming practices in the hills, though they are undergoing transition as well, have not become industrialized as pattern three indicates, to the extent that they have in the plains of India or in developed countries. This is likely due to the difficulty of utilizing machinery to cultivate the hillsides, and the expense of purchasing chemical inputs. Though this study certainly shows a diet change based on foods that are industrially grown in the plains, farming practices have not changed to the extent that consumption patterns have, again pointing to the ways in which the study population do not fit neatly into pattern three. Third, cooking technology has not only "advanced" to the use of clay stoves as pattern three describes, but many families are now using propane tanks and gas stoves, pressure cookers, and other manufactured utensils characteristic of urban families. These items are much easier to transport than large machinery, and can be purchased in the larger towns in the hills as well. Finally, there is very little industrialization in the hills, though pattern three indicates industrialization. The development of industry is very difficult due to the topography, though the area is rich in natural resources (Sati 2005a).

Part of the reason that the respondents' experience does not match completely with pattern three is that these patterns have been developed from a broad and/or national perspective. The types of variation in different subpopulations in not accounted for in this model (Popkin 2002). However, I would argue that an important reason why a single pattern does not match completely with the respondents' experience is due to the aspects of mountain communities that set them apart from other regions of India. The topography, the relative isolation and difficulty in communication and transportation, and the preserved forest and wild spaces that are not commonly found in the plains or coastal areas of India may be reasons that explain the unique transition experience that the respondents have described. This is an important factor that should be taken into account when seeking to address health or ecological problems through policy, development, or education initiatives. Mountain communities may not need the same types of interventions as plains or urban communities. As research and policy goes in to developing solutions for the "double burden" that India is experiencing, it is critical that the full range of transition experiences of hill communities be taken into account.

As illustrated by the second conclusion, the richness of individual impressions and experiences of diet change is an important resource for this understanding of diet change in a local context. This can provide information on the ways in which the nutrition transition in the Himalaya may differ significantly from other parts of India, or may not fall in to a prescribed pattern. The views people have towards the traditional diet may affect their food choices, and may contribute to the significant diet changes that are taking place in ways that may be contradictory. On the one hand, I have discussed positive changes that facilitate women's

emancipation and food security in this study. On the other hand, these data reveal problematic elements of this transition diet for ecological sustainability and the preservation of traditional knowledge. Thus, in order to more deeply understand the unique nutrition transition mountain communities may be undergoing, structural conditions and individual actions are both critical. Women's lived experience in regards to the traditional diet that was studied here helps to shed light on the reasons that people may also be contributing to the change in their own diets, and ways they may also resist the changes. They also help to reveal important gender dimensions that might not otherwise have emerged, and that are critical to take in to account in order to address both women's and men's experiences with diet change.

Impressions of the traditional diet that were shared in this study reveal the diet as both asset and burden. Respondents overall felt that people were healthier in the past and that the traditional diet contributed in part to the healthfulness of their communities. Respondents also attributed healthy characteristics to many traditional foods including high energy content, nutrients, freshness, and medicinal properties, characteristics that were not attributed to store-bought foods. Though respondents generally seemed to accept the tradeoff in the loss of health in store-bought foods, they still emphasized the importance of healthy food. It is possible that were healthy and/or traditional varieties available at the local markets, people would purchase those as well.

On the other hand, respondents also associated the traditional foods with the experience of hunger in the past, and this experience of hunger is intimately connected to the significant changes in diet Garhwalis are experiencing. Foods which are associated with hunger,

eaten out of necessity, are not considered desirable in the present when other options are available. Thus, many traditional foods, due to their association with hunger and necessity, are no longer desirable, and this perception is a factor important to the context of diet change as it motivates people to choose store-bought or new foods.

Another important factor that emerged in this study in regards to women's experiences of the traditional diet is gender. Women ate differently in the past due to factors such as gendered power dynamics in the household, gendered work roles, and reproductive health. Women, especially young women and daughters-in-law, were often not given what were considered "better" foods and not presented with choices in their diet. Women also experienced hunger when food supplies were not sufficient for their families, and when they spent entire days working in the field or forest. Many of these gendered ways of eating have changed. Women now eat what they choose and eat enough, and though they may still serve other family members first, most families have enough to eat so that young women do not have to go hungry. They can also eat desirable foods such as rice and wheat. However, these experiences reveal the relationship between women's work and hunger, of working all day with no food or very little food, and the importance of these experiences in shaping the ways women adjust to and support changes to the traditional diet. If the traditional diet is associated with hunger, restrictions, and a heavy work load, the desire and willingness to accept and develop new foodways may be enhanced.

Due to negative experiences of the traditional diet, it is possible that simply making traditional foods more available would not induce people to purchase them; they may be more

interested in eating foods that they associate with the freedom of choice and the ability to eat for taste rather than just filling their stomachs. It is also possible that respondents are truly supportive of the diet changes and do not want to return. However, the widely held perception of the health of the traditional crops, and the appreciation of fresh, home-grown food that also emerged in this study implies that to lose the traditional crops completely would not be satisfactory for the respondents. Thus, it is possible that an initiative that changes people's negative associations with the traditional foods, and that provides a space for positive experiences with these foods, would prompt people to be more enthusiastic to choose these foods, rather than be forced to eat them, or choose something else. One initiative that was suggested by members of grassroots organizations working in this region during my fieldwork is providing traditional crops, foods, and dishes at tourist locations. Thus, tourists would have the opportunity to experience the culinary aspect of Garhwali culture, while the local people would have the opportunity to see others, urban travelers and even foreigners, appreciating their traditional foods. This is one initiative that may help to create new and positive associations with the traditional foods.

In addition to the importance of individual impressions of the traditional diet, the third conclusion highlights the importance of understanding structural conditions affecting diet change. This understanding can lead directly to identifying the areas for intervention in cases where the negative consequences of diet change are clearly identified. For example, though most respondents felt that the traditional foods are healthier than store-bought foods, they continued to purchase food supplies that they identified as less healthy, foods which also were not part of their traditional diet. They described the availability of food supplies in the market,

facilitated by the construction of roads, as a major factor prompting the change in the hill diet. Thus, roads and access to the market have allowed villagers to fill in the gaps in their diet and avoid the hunger they experienced in the past, to access new tastes, and it has also contributed to a shift away from the traditional diet. However, as Mead et al. (2010) found in their study of the Inuit, identifying the lack of access of healthy foods in the local markets led to health interventions such as increasing access to healthy foods in those markets. Similarly, the fact that traditional foods such as grains and pulses are not found at the local market could point to the possibility of making those foods available at local markets, developing packaged food items utilizing traditional crops, or other ideas in which traditional foods would be more readily available for purchase for hill communities.

Another structural factor respondents mentioned that has decreased the availability of traditional foods is decreasing yield. Due to reasons such as forest management policies, declining soil fertility and soil erosion, and decreasing farm size for family units, respondents shared that they have experienced decreased crop productivity. This has, in part, led them to depend more heavily on purchased food supplies from the market. Addressing issues of soil fertility, forest management, and land use conflicts could lead to the possibility for households to cultivate greater quantities of traditional foods.

Respondents also described the impact that agricultural work has on changes in the diet. The challenge of agricultural work in the hills, the types of work involved in cultivating, processing, and preparing the traditional foods, and the relationship women have to agricultural work has impacted the hill diet. Overall women reported less interest in farming

than in previous years, related to the fact that their families currently depend less on their fields. Moreover, decreasing productivity, increased education, and minimal opportunities to work outside the home have contributed to a feeling of frustration with farming and a decreased desire to carry out agricultural work. This change in attitude towards farming is related to the increased dependence on market products as well, which has contributed in large part to the change in the hill diet. Finally, some traditional crops require greater amounts of work to process which has caused women to stop growing them, and ultimately dropped these foods from the hill diet. Thus, women's experiences with agricultural work and the nature of the work itself are critical to take into consideration when advocating to maintain traditional foods in the diet. Perhaps, if agriculture were economically viable, women would be able to earn an income from the immense amount of work they already do. Moreover, the development of appropriate technology for hill agriculture in relationship to traditional crops would allow hill households to more easily cultivate their crops. If there were a market for traditional crops, this would allow hill communities to maintain traditional varieties, while earning an income. This, of course, could be problematic for many reasons, one being that women may continue to bear the burden of the work. This could be mitigated by the reintegration of men into agricultural work in the middle hills. Secondly, the communities could end up selling all of their products to "health-conscious" urban markets and not have access to their own foods. However, this is one possibility for addressing the ways in which agricultural work has led to a change in the traditional diet.

Finally, the results show that a changing climate could be one factor that would affect the ability of people to maintain their traditional agricultural practices, and, therefore, their

traditional diet. More research in the study area is critical for identifying ways in which Himalayan communities can adjust more quickly to climatic changes.

The results of this study show that the respondents are indeed undergoing a diet change, and possibly a "nutrition transition." Many of the traditional foods that are considered very healthy are being dropped from the diet, while respondents have described an increasing reliance on purchased food supplies, which they perceive as less healthy. It is not clear to what extent the respondents are experiencing negative consequences such as diet-related diseases. However, there is a significant loss of knowledge taking place, ecological problems associated with shifting agricultural practices, and the potential loss of food sovereignty for a community that has previously been able to provide for themselves, now being dependent on a globalized, industrialized food system. At the same time, women report decreased hunger and the possibility for lighter workloads as their diet transitions. Thus, as hill communities, researchers, and policy makers seek to address concerns of environmental degradation and the loss of traditional knowledge in the hills, women's lived experience must be central to future planning. Ecological sustainability and preservation of tradition must not take precedence over women's agricultural workload and dietary needs, nor can the burden for these goods be placed on women. This study highlights the need to make gendered experience central to the visioning of an ecologically healthy and socially just future in the central Himalaya.

Further Research

This study has revealed many places for further research that may be of benefit to hill communities. The results of this study did not provide information as to the actual diseases or health problems that the respondents now experience, and the association of these diseases with diet change. Thus, assessing whether the diet change has or likely will cause an increase in diet-related diseases, from a gendered perspective, is critical. Furthermore, though significant research has been done on the ecological problems associated with changing agricultural systems (Maikhuri et al. 1996; Negi et al. 2009), an assessment of knowledge loss (knowledge of agriculture, food preparation, health, and identifying wild foods, for example) and of food sovereignty is also critical. Though simply purchasing food does not inherently mean that a community is not sovereign, the opportunities for hill communities to have ownership and decision making power in the globalized, industrial system must be more clearly understood, so as to avoid the situation where hill communities have no other options but to purchase foods, yet have no control over what foods are sold in the local markets.

Secondly, developing economic opportunities is critical for the survival of hill households. Earning an income allows families to purchase needed supplies for the markets. However, economic opportunities are limited. Research into the possibilities of developing products and services, that women can and would like to also participate in, is critical for developing viable opportunities. Moreover, the possibility for integrating men back into agricultural work could lead to a decreased burden on women, more productivity if more people are involved, and the development of products that could be marketed within and

outside the hills. This may contribute to raising the value of agricultural work in the eyes of all hill people, and may address the increasing male outmigration that can be stressful for households.

Finally, a deeper understanding of the structural conditions affecting diet change in the hills is critical. Several key factors such as ecological change, forest management, and state and federal government policy in regards to research and food distribution priorities, play a significant role in diet change. Exploring media such as television, as well as cultural changes brought about by contact with travelers and by returning migrants, are also areas that can provide rich opportunities for understanding the complex process of diet change. Investigating these structural conditions in more detail, and the unique ways that mountain communities may be affected, will lead to a greater understanding of the specific areas in which policy and programs can have a positive impact on the hill diet.

APPENDICES

APPENDIX A: INTERVIEW QUESTION GUIDE

1. What are some major changes you have noticed in your lifetime here in your village?

2. Can you describe your daily routine? How has it changed over time?

3. What types of foods did you eat on a daily basis when you were growing up? (Breakfast? Lunch? Dinner?)

4. Where did you obtain these foods from?

5. Can you describe different varieties of (grains, greens, vegetables, etc) that you/your family used to eat? Can you describe different varieties of (drinks, spices, wild foods, etc) that you/your family used to eat?

6. How did the types of foods cultivated and eaten differ by season?

7. Are any of these foods not eaten anymore? Why?

8. Can you describe the types of foods you and your family eat on a regular basis nowadays? Where do you obtain this food from?

9. Can you describe any new foods that you eat now that were not available in the past? Where do obtain these foods from?

10. How do you choose what to prepare for your family's meals? Are there any foods that are more difficult/easier to prepare?

11. What types of foods were given in the past when someone became ill?

12. What types of foods were given to women during pregnancy? What were the reasons for giving these foods to pregnant women?

13. Were there any special foods for children? How did you decide what foods to give to children?

14. What types of cooking utensils did you use regularly in the past? How have these changed?

APPENDIX B: FOCUS GROUP QUESTION GUIDE

1. What are some major changes you have noticed in your lifetime here in your village?

2. Can you describe your daily routine? How has it changed over time?

3. What types of foods did you eat on a daily basis when you were growing up? (Breakfast? Lunch? Dinner?)

4. Where did you obtain these foods from?

5. Can you describe different varieties of (grains, greens, vegetables, etc) that you/your family used to eat? Can you describe different varieties of (drinks, spices, wild foods, etc) that you/your family used to eat?

6. How did the types of foods cultivated and eaten differ by season?

7. Are any of these foods not eaten anymore? Why?

8. Can you describe the types of foods you and your family eat on a regular basis nowadays? Where do you obtain this food from?

9. Can you describe any new foods that you eat now that were not available in the past? Where do obtain these foods from?

10. How do you choose what to prepare for your family's meals? Are there any foods that are more difficult/easier to prepare?

11. What types of foods were given in the past when someone became ill?

12. What types of foods were given to women during pregnancy? What were the reasons for giving these foods to pregnant women?

13. Were there any special foods for children? How did you decide what foods to give to children?

14. What types of cooking utensils did you use regularly in the past? How have these changed?

APPENDIX C: Verbal Consent Script for INTERVIEWEE

You are being asked to participate in a research study entitled *Gender and Diet Change in the Central Himalaya.* As many changes are taking place in the Himalaya in regards to agricultural systems and food, it is important to understand how the traditional diet is changing; and the reasons for these changes. The purpose of this study is to learn about the ways that women, particularly elder women, view the changes to the traditional diet of the region; and to document women's health perceptions of the traditional diet. This understanding, as well as local knowledge about the traditional diet, can help to prevent negative health or ecological consequences associated with recent changes.

There are no known risks to this study. During this interview, you will be asked a series of questions about the types of foods you ate in the past; how your diet has changed; and your perceptions about the health benefits of the traditional diet. This discussion will last approximately one hour.

The information you share will be used in academic articles and presentations. Your identity will be disguised so that your name is not associated with any information you provide. You will be asked your permission to record the interview simply for the sake of being accurate and capturing your precise comments for our records. There will be no compensation for participating in this study.

You have the right not to participate, to refuse to answer any questions, or to withdraw at any time. Your confidentiality will be protected to the maximum extent allowable by law. To ensure confidentiality, once the interview has been transcribed your name will be removed from all materials pertaining to you. Data will be secured in the primary researcher's office and will only be accessed by the researchers and the Internal Review Board at MSU.

The primary researcher has no conflict of interest related to this project. She does not stand in any way to financially benefit from your participation in this study.

If you have any questions about this research study, you may contact Dr. Wynne Wright by phone (517)-884-1372; email wrightwy@anr.msu.edu; or by regular mail at Michigan State University, 330B Natural Resources, East Lansing, MI 48824.

If you have questions or concerns about your role and rights as a research participant, or would like to register a complaint about this research study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180; fax 517-432-4503, email irb@msu.edu, or by regular mail at 202 Olds Hall, MSU, East Lansing, MI 48824. By participating in this interview you indicate your voluntary agreement.

APPENDIX D: Verbal Consent Script for FOCUS GROUP PARTICIPANT

You are being asked to participate in a research study entitled *Gender and Diet Change in the Central Himalaya.* As many changes are taking place in the Himalaya in regards to agricultural systems and food, it is important to understand how the traditional diet is changing; and the reasons for these changes. The purpose of this study is to learn about the ways that women, particularly elder women, view the changes to the traditional diet of the region; and to document women's health perceptions of the traditional diet. This understanding, as well as local knowledge about the traditional diet, can help to prevent negative health or ecological consequences associated with recent changes.

There are no known risks to this study. During a group discussion, you will be asked a series of questions about the types of foods you ate in the past; how your diet has changed; and your perceptions about the health benefits of the traditional diet. This discussion will last approximately one hour.

The information you share will be used in academic articles and presentations. Your identity will be disguised so that your name is not associated with any information you provide. You will be asked your permission to record the discussion simply for the sake of being accurate and capturing your precise comments for our records. There will be no compensation for participating in this study.

You have the right not to participate, to refuse to answer any questions, or to withdraw at any time. Your confidentiality will be protected to the maximum extent allowable by law. To ensure confidentiality, once the discussion has been transcribed your name will be removed from all materials pertaining to you. Data will be secured in the primary researcher's office and will only be accessed by the researchers and the Internal Review Board at MSU.

The primary researcher has no conflict of interest related to this project. She does not stand in any way to financially benefit from your participation in this study.

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