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## Food and Diet in the Andes: Changing Markets and Lives in Nuñoa

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Food and Diet in the Andes: Changing Markets and Lives in Nuñoa

A Thesis Presented

by

JAMES A. L. FISHER

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
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Department of Anthropology

Food and Diet in the Andes: Changing Markets and Lives in Nuñoa

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ABSTRACT  
DIET IN THE ANDES: CHANGING MARKETS AND LIVES IN NUÑO A  
MAY 2015

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The town of Nuñoa, located in the southern Peruvian Andes, has been the ongoing focus of anthropological research. Household surveys of diet and food security (n=69) administered during 2012 are analyzed here and compared to past studies from previous decades. Study results show clearly that the amount and diversity of new foods available in the area has increased dramatically, but also gives evidence for continued disparate access to certain types of food along class lines. Socioeconomic status had a significant negative correlation with food insecurity and poor households more frequently consumed both potatoes and other cheap, high carbohydrate foods such as rice, noodles, and flour. In contrast, foods eaten significantly more often by wealthier households included cheese, fish, and vegetables, all of which have become much more available since dietary surveys were conducted in the late 1960s. It is likely that many rural families have migrated into the center of town looking for steady employment, which has decreased dietary seasonality and increased reliance on market access.

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## CHAPTER 1

### THE THESIS

#### **Introduction**

Rural populations in Latin America have seen immense changes to almost every aspect of their lives in the last half century. The residual impacts of agrarian reform coupled with new developments to infrastructure and market access have been well documented in a variety of locations (e.g. Thiesenhusen 1995; De Janvry and Sadoulet 2000). In many places, new forms of wage labor coupled with shifts from subsistence to capitalist farming affect not only local economic structures but also diets and food systems.

The implications of economic and dietary transitions on health are of immense consequence to individuals and nations alike, yet the complex systems that inform different outcomes in different places are not always fully understood. Often it is hard to project how a community will change in response. Anthropologists have long documented such transitions in the southern Peruvian Andes, allowing for an especially detailed investigation of how rural populations have traditionally managed environmental and economic stressors, and how they are beginning to manage novel ones.

Food use in the past few centuries has undergone a rapid “delocalization” (Pelto and Pelto 1983) characterized by new types of food and an increasing network of interdependent production methods. In urban centers, especially in industrialized countries, this has manifested as an explosion of food diversity, much of which is



imported from great distances. For such populations, the resulting changes to diet have been associated with fewer nutritional diseases and improved health outcomes. Yet these exact same processes of delocalization have had opposite effects in rural places and for the urban poor, where individuals and households lose control of their own food supply by entering new capitalist market systems (Pelto and Pelto 1983; Dewey 1989). Studying the connections between diet, local economies and changing cultural value systems not only shows us how human health has changed in recent history, it can be a good predictor of its future. The role of food economics, diet, and nutrition transitions in human health interest anthropologists working across the globe. Many of these are site-driven: the Shuar Health and Life History Project, run by Larry Sugiyama and Josh Snodgrass at the University of Oregon, is an interdisciplinary research initiative tracking the effects of recent market integration on a wide variety of health outcomes ([bonesandbehavior.org/shuar/](http://bonesandbehavior.org/shuar/)). Other anthropologists use such questions to contribute to comparative, cross-cultural health research. At the forefront of pediatric obesity research, Jonathan Wells is involved in research projects across Europe, South America, Africa, and Asia to look broadly at human energy metabolism and body composition (recent publications demonstrating this range include Pomeroy et al 2014; Wells 2014; Siervo, Sabatini, and Wells 2013).

In the southern Peruvian Andes, major changes in food market expansion and transportation infrastructure in recent decades lead us to ask specifically about the state of food access and availability. While availability shows us what products can be purchased in an expanding food market system, access speaks instead to whether these new foods are affordable and have entered diets on a regular basis. In other words, has the diversity

of food now available in local and regional markets led to greater dietary diversity, and for whom? In particular, do we see disparities in access and diet diversity along class lines, or between rural and urban locations? This paper will examine data collected via participant observation, semi-structured, and structured interviews (including household food frequency questionnaires and 24-hour diet recalls) in 2012 in the District of Nuñoa (Melgar, Puno) to better understand the current state of market availability and access and how it has changed over the past 30 years.

### **Brief history of Andean diets**

How has diet in the southern Peruvian Andes changed over time? The quest for sustenance in the Andes has long been a story about maximizing yield from a handful of starchy tubers and grains that can withstand the altitude and cold. For the Inca civilization between the 13<sup>th</sup> and 16<sup>th</sup> centuries this was namely the potato (of which about 4,000 varieties exist within Peru), sweet potato, oca, *papalisa* (another potato-like tuber), corn, quinoa, and *cañihua* (another pseudo-grain closely related to quinoa). Meat was largely harvested from llama and alpaca herds, guinea pig, and wild game such as vicuña and guanaco (Popenoe 1992; Coe 1994). However this was by no means an exhaustive list of foods available to Incans, who employed an agricultural economic model known as the vertical archipelago, whereby migrants exploited ecozones from the altiplano down to jungle regions for their various recourses (Murra 1985). This model allowed for relatively easy access to and distribution of resources from different climates (Van Buren 1996).

These traditional crops and the easily-stored products made from them, such as *chuño* (varieties of freeze-dried potato), have remained central to Andean diets through

the 20<sup>th</sup> century, even as new forms of infrastructure introduced imported processed foods like flour, pasta, and new cuisines and dishes such as *chifa* (Chinese-Peruvian cuisine) and *pollo a la brasa* (broasted chicken) from urban centers elsewhere in the country. Today, the Andean diet is certainly a hybrid one where *chuño*, fried trout and rice can easily be mixed together into a meal. Even more recently, new vegetables and fruits are increasingly available, as are soda and snacks like potato chips and candy bars.

### **Andean research and the changing biocultural perspectives of health**

Interest first grew to study Andean populations in the 1960s when the predominating goal was understanding human adaptations to extreme environments. Baker and Little's *Man in the Andes* (1978) and the American Anthropological Association's monograph *Health in the Andes* (Bastien and Donahue 1981), for example, combined studies of ecological and biological stress and response in a high altitude environment. These projects grew out of the International Biological Programme, which ran from 1964 to 1976, and later UNESCO's Man and the Biosphere Program and brought together many anthropological subfields to better understand human adaptation and ecology (Larsen 2010).

Through the decades that followed prominent anthropologists have argued over the legitimacy of different foci of biocultural anthropology. This continuing conversation has had profound influence over anthropological research questions and theoretical frameworks. In the paragraphs that follow I will highlight a few of the most outspoken voices.

In response to growing discontent with Cartesian dualism across the disciplines of the life and social sciences, evolutionary biologist Richard Lewontin and population geneticist Richard Levins wrote their 1985 book *The Dialectical Biologist* in order to offer an alternative theoretical framework. Adaptation, they point out, is one of those ideas so potent that it progresses quickly from explaining everything to explaining nothing. They warn of three hidden Cartesian assumptions of adaptive analysis. One, that the common task of partitioning organisms into traits and the environment into problems is assumed to have some real, natural basis beyond intuitive human categories. Two, that environmental problems can be isolated and solved independently. And three, that all organismal traits are actually adaptive. The last one has often encouraged researchers to go to extremes coming up with adaptive explanations for traits, as opposed to asking if they are adaptive in the first place. This adaptationist program is so inherent to the “vulgarization of Darwinism” that an increasing body of scientific literature relies on it (Levins and Lewontin 1985). With specific regard to sociobiology, Lewontin states that the adaptationist program is tautological, untestable, and diminishes the field to idle speculation (Lewontin 1979).

Despite their critiques, Lewontin and Levins do not urge the social sciences to abandon studying adaptation. On the contrary, adaptation is a powerful force that should be understood correctly and applied appropriately. In contrast, a critical medical anthropological approach has called for the abolition of the concept in favor of choosing a new, more productive paradigm. Adaptation, says Merrill Singer, easily becomes a form of victim-blaming (Singer 1989), and does not consider the complex relationships and histories between humans and their environments in sufficient detail. He sees

attempts to fix biocultural understanding of adaptation and the environment as “pouring old wine into new skins.” Instead, anthropologists must be willing to embrace political economy with the same vigor that they do biology and ecology. He does not wish to throw out all of biomedicine, but urges researchers to continually remind themselves that it is culturally constructed and only one specific epistemology (Singer 1996).

While Singer sees a place for biology and the health sciences in the future of anthropology, other critical medical anthropologists have removed not only the study of the physical body, but also much of the physical body itself from their frameworks. For example, Nancy Scheper-Hughes and Margaret Lock’s “The Mindful Body: A Prolegomenon to Future Work in Medical Anthropology” describes three bodies, the body-self, the social body, and the body politic. While the material body and its mechanisms are inherently a part of the body-self, their importance is greatly downplayed in response to centuries of Cartesian dualism that have prioritized them as a distinct, independent category with dominance over the others (Scheper-Hughes and Lock 1987).

In response to these criticisms Andrea Wiley comes to the defense of biocultural anthropology. Singer, she argues, is fighting a biocultural straw man in which the environment, or Nature, is monolithic and distinctly separate from human beings and society. Biocultural anthropologists are actually well situated to parse apart the concept of the environment in a multitude of ways because its broadest definition contains not only the abiotic, but also the biotic, social, and cultural. The biological substrate as variable, either independent or dependent, removes the potential for determinism and investigates the dynamic relationship individuals have with various aspects of their environment (Wiley 1992). Wiley further warns Scheper-Hughes and Lock that by

inverting the common biomedical understanding that the body controls the mind, they have not escaped reductionism. Reductionism can only be averted by recognizing networks of multiple causation, which again can be achieved through the nuanced biocultural definition of environment. Nonetheless she incorporates both of these critiques into her development of a “critically informed biocultural medical anthropology.” If there is room for adaptation, it is through a careful rethinking of individual and group interactions within an environment (Wiley 1992).

Wiley builds this framework off of that already begun by R. Brooke Thomas and his students and the University of Massachusetts, who were integrating political economy, ecology, and human adaptability into their research (Thomas, Gage, and Little 1989; Goodman et al 1998). Much of this work took place in Nuñoa and was also influenced by developments in Andean ethnography (e.g. Starn 1994) and local political realities. While many locations have played contributing roles, the District of Nuñoa has been a keystone field site throughout recent decades, witnessing the full range of research beginning with high altitude stress and adaptation (Baker and Little 1976) up through political economic and ecologic explanations for household production and health (Leatherman 1998). This legacy of research makes Nuñoa a valuable site for both longitudinal comparative work and understanding the rich history of biocultural anthropology.

Other contemporary biocultural anthropologists have employed the framework broadly to study a variety of interactions. David Himmelgreen teases out complex relationships between diet, migration, and globalization to build on current understandings of nutrition transitions and acculturation (Himmelgreen et al 2014).

Several researchers use a biocultural framework to unpack the prevalence of food insecurity and child stunting and wasting in marginalized communities (Crooks, Cliggett and Cole 2007; Hadley and Wutich 2009; Huff 2014). Psychological anthropologists have found common ground with other sub-disciplines by examining how biocultural approaches overlap with their own holistic inquiries (Hruschka 2005). Others stretch the common boundaries of anthropological research by using a biocultural framework to look at how people learn physical movements (Downey 2005). This diverse group of researchers promise to move the theory forward as an innovative area of anthropology that allows for increased cross talk and collaboration between sub-fields.

### **Previous studies and their political context**

The District of Nuñoa is located in the Melgar province of the department (region) of Puno at about 13,000 feet, half a day's bus ride from Cusco to the Northwest, or from Lake Titicaca to the Southeast. It has a population of about 14,000 residents, mainly Quechua and *Mestizo*, most of which herd alpaca, sheep and cows, and farm subsistence crops. The town of Nuñoa, about an hour's drive north from Ayaviri, the provincial capital, acts as the capitol and urban center for the district, and home to about half of the district's residents. It contains the municipal government, a bank, a health center, and several schools, along with a variety of commercial enterprises suited for the region.

Rigorous diet research began in earnest in 1969 with Martin Gursky's MA research, and by Emilio Picon Reategui while he was a student of Baker's working on a chapter for *Man in the Andes* (1978). At the time the district population was estimated at

only 8,000, with 2,137 living in the town itself. Gursky sampled three areas: the town of Nuñoa (capitol of the district), Sincata, an indigenous community of about 25 families located 20 km southwest at an elevation of 13,000 feet, and Chillihua, an *hacienda* located 25 km northwest at an elevation of almost 14,000 feet. A 3-day dietary survey was administered in all sites with cooking methods, precise weights and proportions recorded. In terms of dietary diversity, Gursky found 25 food items represented in town, 23 in the community, and only 12 in the *hacienda*. Thus the town and the community had comparable diversity, both being about twice as much as that found in the *hacienda*. The major items consumed in town were *chuño*, other types of potatoes, salt, bleached wheat flour, sugar, bread, cheese, rice, corn meal, and fresh fruit. Eighty-four percent of families in town also ate meat.

Non-local foods coming into the town of Nuñoa (via railroads linking Cusco and Juliaca, and Arequipa near the coast) composed 53.5% of the bulk of food consumed (products derived from wheat and maize accounted for 43.6% of bulk food consumed). By contrast, only 3.5% of bulk food in Sincata was non-local (products derived from wheat and maize accounted for 1.7%). In Chillihua, where the higher altitude led to frequent frosts and made it difficult to grow many crops, 34.3% of bulk foods consumed were foreign products, comprised mostly from white wheat flour, wheat kernels, and maize (29.5% from wheat alone).

However the diet for all sites remained largely vegetarian with quinoa being the most commonly consumed item and onions being the most common vegetable. There was a failed potato harvest that year (1967) which skewed consumption of that item. It is likely that in a different year potatoes would have been more frequently consumed than



quinoa. There was no reported consumption of eggs, chicken, or fish, although milk was occasionally consumed between December and May (Gursky 1969).

As a chapter of Baker and Little's *Man in the Andes* (1978), Emilio Picón-Reátequi collects and comments on data collected by Mazess and Baker (1964) and Gursky (1969). He points out that explanations for the lack of eggs, chicken and fish might be related to the practice of wages being distributed in the form of agricultural products, or the common practice of selling such food items to purchase cheaper, more energetic foods, as well as tools for general use at home (Picón-Reátequi 1978).

In 1968 the Velasco government instigated a series of major economic changes. One goal of the regime was to simultaneously improve the rural standard of living and increase the domestic food supply. They aimed to do this by breaking up *haciendas* in order to increase rural agricultural production and better integrate rural populations into the national economy as food producers. Unfortunately, while private land holdings were largely reorganized into state-supervised cooperative production units, this did little to redistribute resources in the rural highlands to indigenous agro-pastoralists. Increased availability of non-traditional foods was also underway due to both the agricultural reform, national food policies, and urban biases for cheap, imported foods (Appleby 1976). For example, subsidized wheat imports purposefully kept flour cheap and widely available while profiting a few multinational corporations (Painter 1983). Dismantling the *haciendas* freed much of the rural population from the system of peonage that had exploited them for over a century, but it did not grant them access to any new land or modes of production. Thus many landless ex-sharecroppers in the district moved into town looking for wage labor. While regional and local market growth increased

consumption norms, the relative price of commodities inflated dramatically. With less access to land and household production, even simply acquired items like dung for fuel and *ichu* grass for roof thatching became things that some families had to purchase. This in turn exacerbated dependence on cash and wage labor (Leatherman 1994).

In 1983/84, Leonard and Thomas set out to document two decades worth of social and economic changes and their impact on food consumption, the extent that diet was still influenced by seasonality, and how diets differed along socioeconomic lines. They sampled 33 houses, a lower and middle SES representative subset of a larger study on illness with the community. Nutritional data were collected by means of individual food weighings before and after meals. A minimum of one complete day was acquired from each family, and for 29 households at least one day in both pre- and post-harvest seasons was collected. A total of 51 different foods were observed (excluding herbs and spices and combining all meat into one group), more than double what Gursky found in 1967. New items included processed foods like canned evaporated milk, oatmeal, pasta, chocolate, and many fruits and vegetables from other regions. However the same proportion of calories were accounted for by the same seven foods, suggesting that actual dietary diversity has changed little (Leonard and Thomas 1988).

Further work by Leatherman during the same study documented differences between two rural and one semi-urban population in the area through interviews about health and household economy. All three sites were considered politically and economically marginal, relatively impoverished, and in relatively poor health compared to regional and national economies. The town had seen improvements to markets, transportation, schools, and the health system, but economic variation between classes

was increasing. Compared to Gursky's findings in 1969, this study found that town households were now consuming 23 items, community households (formerly studied by Gursky) were consuming 16, and cooperative households (living on the site of the former *hacienda* studied by Gursky) were consuming 21. Poorer households ate fewer meals with meat, dairy, and vegetables. Differences in food storage also existed between the different sites, with town households storing very few foods and none in quantities to last a month at normal consumption levels, while community households stored five foods, two of which could last a month, and the cooperative stored ten foods, six of which could last a month. Herders in the cooperative reported less illness and work disruption than people in the town and community. Overall, people in town showed the greatest increase in dietary diversity, but fell between the other two sites in terms of illness levels and nutritional status. The community's dietary diversity actually fell, while the cooperative's rose along with the town's due to a new political arrangement, illustrating how shifting political economic circumstances and access to land led to shifts in access and dietary diversity (Leatherman 1994).

The late 1980s and early 90s brought *Sendero Luminoso* to the altiplano. Beginning in the Department of Ayacucho, the Communist Party of Peru recruited many impoverished *campesino* communities before the government mustered a response. By 1986 combatants were operating in northern Puno and raiding the surrounding area, targeting cooperatives and larger landowners, stealing cattle and destroying buildings. In the capital of the district the next five years were a time of intimidation, assassinations, market disruption and general fear. By 1990 there was no organized police force left and *Sendero* declared Nuñoa a "liberated zone," moving in and out of town at will and

periodically burning buildings. Their activities finally abated after Abimael Guzman was captured in Lima in 1992, and then president Alberto Fujimori sent a more permanent army force to the region (Leatherman and Thomas 2009). This period of economic and political upheaval, while studied somewhat through interviews during Leatherman and Thomas' brief visits since, has had largely unknown short and long term effects on the population. What is clear from the interviews and department-level data from the 1990s is that food availability plummeted, leaving many *tiendas* empty and increasing food insecurity (Leatherman and Thomas 2009). The area saw no improvement in child growth over the 1980s (Pawson et al 2001), while other regional and national surveys did see such improvements (WHO 2014; Pawson et al 2001). The repercussions of *Sendero Luminoso* aside, the 30 year period between the late 1960s and late 1990s showed steady but modest market growth, increased wage work and infrastructure, but persistent poverty. While conditions of poverty persist in much of the district, over the past decade shifts in the national and regional economy along with improved infrastructures and market growth have created the contexts where changes in availability, access, and diet diversity are emerging.

### **Current day Nuñoa**

Since the late 1990s many changes are evident: there are more roads and they are better built, leading to better supply lines from urban areas. Infrastructure developments have allowed access to telephone networks and internet, making this town in the southern Andes much less functionally remote. In recent years some herders have started pooling

cow's milk in dairy collectives where they make cheese to sell locally and to pizzerias in Cusco. When Gursky describe the newly created Sunday market in 1967, he wrote,

such products as bread and fruits (oranges, bananas, avocados and grapes, according to the season) could be obtained. Every two or three weeks merchants from Puno or Juliaca came with their trucks bringing products from the coast such as: wine and pisco from Tacna, molasses from Arequipa, dry yellow and red peppers, maize, and dry fish from Cuzco (Gursky 1969, p. 15).

Many of these items are now available daily in town and the market itself has expanded to include virtually every item found in a moderately well-stocked department store.

Tropical fruit is abundant, as are hardware, clothing, office supplies, books, and toys.

The town has over 100 permanent *tiendas* that sell food all day, as well as several butcher shops that open at scheduled times. Store owners travel to larger urban centers such as Ayaviri and Juliaca frequently to pick up fresh produce and packaged food. Fruits and vegetables in good condition are visually abundant throughout the center of town. On Thursdays the *camal*, a large open-air butchering operation processes livestock, especially alpaca and sheep, to sell to local customers and ship to urban markets. Prices for common items are kept relatively constant from store to store and do not vary dramatically in price from comparable items in Cusco.

There are two types of restaurants: *pensiones* sell fixed menu lunches and dinners and cater especially to wage workers in town. Regular customers can keep tabs to be settled at the end of the month. *Pollerias* are restaurants that only sell *pollo a la brasa* (roisserie chicken and French fries), a dish popularized in Lima in the 1950s.

Hot meals are also available from street vendors which begin to gather in the center of town at dusk. Fried chicken, noodles, and popcorn are commonly available. Throughout the rest of the day mobile carts carry fruit and packaged snacks such as

candy bars, potato chips and soda and position themselves on busy street corners, or near large events such as weddings. When schools let students out for lunch and recess food carts gather in the school yard to sell them sandwiches and other lunch items.

### **Methods**

In the summer of 2012, we conducted market surveys, semi-structured and structured interviews, and participant observation to assess the current state of food environments, food systems, and diets in the capital of the district, and changes that had occurred since the 1980s when comparable data was collected. To gain as much context as possible about the current state of market integration in Nuñoa, the town was mapped manually on foot to identify each *tienda* and other important locations, such as small butcher shops, veterinary clinics, and churches. In addition the stalls at the weekly Sunday market were surveyed for product quantity and diversity, as well as prices. And finally three local *tienda* owners were administered semi-structured interviews about their businesses and the local economy. Specific questions were asked to corroborate general trends revealed from household surveys and other observations about what foods customers generally purchase.

Household surveys on changing food habits and diets were administered through opportunistic sampling with the help of three women from town. When possible, a research team member accompanied one of the research assistants and took notes during the interview. Houses were chosen based on who our assistants believed to be the most willing to participate, and with an effort to acquire samples of households at different

economic levels. In total, 69 households were surveyed and despite some inconsistencies in data collection, 68 surveys were at least partially useable.

Based on survey responses, surveyor observations of houses and possessions, and information from key informants, socioeconomic status (SES) was assigned to each household.

Subjects were asked about household demographics (family size, names, sexes, ages, years in school, and literacy), religion, nature of work and income, enrollment in *Juntos* (a social assistance program for families with young children), how foods have changed in the area of the last 20 years, how often the family eats away from the house, what sorts of foods are saved and for how long, how much is spent weekly on food (in soles), and personal perceptions of which foods are healthy and which are unhealthy. A food frequency questionnaire (FFQ) of 27 common foods was administered as part of the survey. Households were asked if they consumed an item daily, weekly, monthly, rarely, or never. An “other” category allowed subjects to write in any missing food items. A free listing 24-hour food recall for the individual subject followed to get further detail on foods eaten and to cross-reference the information given in the FFQ. Responses to the 24-hour recall were inputted into DietMaster Pro using reasonable portion sizes and substitutes as necessary.

The final portion of the survey was a 5-question measure of household food security drawn from the HFIAS survey Spanish translation (Coats et al 2007). Some modifications were made following review with local assistants. The questions were as follows:

1. In the last four weeks have you worried that there is not enough food or money in your household? (Anxiety)

2. Have you or a member of your household had to eat less than you need to because of lack of money? (Scarcity)

3. Have you or a member of your household had to eat fewer meals/times a day because of lack of food or money? (Scarcity)

4. Have you or a member of your household gone to bed without eating because of lack of food or money? (Scarcity/hunger)

5. Have you or a member of your household had to go an entire day without eating anything because of lack of food or money? (Scarcity/hunger)

These questions were answered with “no,” “sometimes,” or “yes,” which were scored as 0, 1 or 2, respectively.

Based on our research assistants’ personal knowledge of families and observations of living conditions (e.g. source of potable water, electricity, type of kitchen and stove, etc.) and material possessions (e.g. bicycle, motorcycle, radio, television) a relative socioeconomic ranking (SES) was assigned to each household. To create a profile of the average low and high SES households, independent sample t-tests were performed for family size, soles spend on food per week, and 24 food items. FFQ items were coded as being eaten daily (4), weekly (3), monthly (2), rarely (1), or never (0). Thus averages for the entire sample, or subsets of the sample, could be calculated between 0 and 5. For example, the average cheese consumption for the low SES households was 1.95, meaning that their average family consumed cheese almost once a month.



Institutional Review Board approval was obtained for this pilot project on Jun 4, 2012 from the Anthropology Department at the University of Massachusetts.

## Results

### **Household demographics**

The number of family members ranged from one to eight with a mean of 3.5. Sixty-two (91%) households had adult women, while only 36 households listed adult men (53%). It is possible that some households excluded men from the survey because they were not living with the rest of household or because they had out-migrated and were effectively absent for an extended period. The latter is probably much more common, and often female heads of household indicated they were receiving extra income from their husbands in other towns and cities, even though this was not clear through survey question responses.

Table 1: Household demographics

Heads of Household	Female	Male
Number (% of households containing)	62 (91)	36 (53)
Median age	40	44.5
Education Level	N=59	N=33
None (%)	6 (10.2)	1 (3)
Primary (%)	25 (42.4)	12 (36.4)
Secondary (%)	16 (27.1)	14 (42.4)
Superior (%)	9 (15.3)	4 (12.1)
University (%)	3 (4.4)	2 (6.1)
Literate	37 (n=54, 69%)	20 (n=23, 87%)

The age of female household heads ranged from 17 to 74 with a median of 40. Thirty-seven women were reported as literate (69%) and 56 (89%) reported attending school at least through the primary grades. The age of reported male household heads ranged from 19 to 77 with a median of 44.5. Twenty men were reported as literate (87%) and 32 (97%) reported attending school at least through the primary grades. Forty-seven households (82% of 57 valid households) contained at least one literate adult. The majority of households were Catholic, but four identified as Evangelical and one identified as Pentecostal.

### **Work, income, and assistance**

Households reported their work as agricultural, pastoral, commercial, wage labor within Nuñoa, wage labor outside Nuñoa, or a combination of these. Agricultural work was performed exclusively in 9% of households, as was pastoral work. More commonly these two were practiced together (14%) or in conjunction with other work. The largest category engaged in exclusively was wage work (16%), which included seasonal work on other people's land, municipal work, and service work like washing clothes. Most commonly, households participated in several forms of labor. Wage work in particular was combined with other occupations in 31% of households.

Table 2: Types of occupation

<b>Occupation</b>	<b>Number of households (%)</b>
Agriculture only	6 (9)
Livestock only	6 (9)
Agriculture and livestock	9 (14)
Commercial	8 (12)
Wage work in Nuñoa	10 (15)
Wage work in Nuñoa and elsewhere	3 (5)
Combination of agriculture, livestock, and commercial work	3 (5)
Combination of wage work with at least one other another category	20 (31)

Surveys collected monthly income from 18 households, but this did not produce enough data to be useful and has been left out of analysis.

Fifty-five percent of households were categorized as lower class, 42% were middle class, and 3% were upper class. *Juntos* is a government-run conditional cash transfer program established in 2005 for low income mothers who send their children to school and bring them into health centers for regular check-ups. Fifty per cent of households reported being in the program.

### **Eating behavior and opinions about food**

When asked what food had changed in the last 20 years, 89% percent said they had seen at least some sort of change overall. Noodles and rice were reported as having

increased in prevalence by 46% of households and fruits and vegetables by 28% of households. Other foods that had become more prevalent community-wide included chicken at 10% and sugar at 8%. While this speaks to the apparent availability of food items, and the changes that people can see happening around them, access for individual households was reported as being much smaller: only 22% reported an increase in fruit and/or vegetable consumption and only 19% reported an increase in noodles and/or rice consumption.

In response to being asked what foods households bought in large quantities and stored for more than a month, *chuño* was reported most frequently (87%), followed by quinoa (69%), potatoes (38%) and noodles and/or rice (33%). Only 3 households (5%) stored noodles and/or rice to the exclusion of *chuño* or quinoa. Foods bought on a regular basis (more frequently than monthly) were fruits and vegetables (77%), rice and/or noodles (30% -- all of these households reported keeping larger long term stores of *chuño*, quinoa, *cañihua*, and/or fresh potatoes), sugar (19%), and bread (18%).

Unexpectedly, 35% of households reported eating out at least once a week, often on Sundays after church where they would eat street food (usually noodles or fried chicken). While previous studies have not reported on this particular measure, observationally it has increased since past decades. Only 38% reported eating every meal in their own kitchen, while the remaining 27% reported eating out less than once a week. When asked about how seasonality affected food access and variety, 46% said there was more food during the dry season when the harvest happened while 32% reported that seasonality had no effect at all. Only two households volunteered the information that they ate better when their benefits from *Juntos* came. This was not an intended response

for the question, but was possible because it was open-ended. Of those who could answer confidently about how many *soles* they spent on food every month (72%), the range was between 3 and 150 soles (1 and 50 USD) with a mean of 40 and a median of 35 soles. When divided by the number of family members, this ranged from 1.5 to 50 soles per family member per month. Even at the high range this is quite low and probably reflects some amount of self-provisioning by the respective household.

In response to the free listing of healthy foods, quinoa was reported by 73%, *cañihua* by 56% (only once to the exclusion of quinoa), vegetables by 37%, fruits by 36% (vegetables were reported to the exclusion of fruit only three times and fruit was reported to the exclusion of vegetables only once) barley by 27%, and eggs by 15%. Few households wrote in explanations for their choices, but those that did specified that traditional foods like quinoa and *cañihua* were healthy because they kept you full for long periods of time and fruits and vegetables were healthy because they contained vitamins and minerals. Responses about unhealthy foods had a much larger variety with the most frequent response being soda (26%), followed by fried chips and snacks (23%), *pollo a la brasa* (21%), candy (21%), and noodles (19%). Certain responses were qualified as “too much” of an item. For instance, chicken listed on its own (two cases) specified that having too much chicken makes it an unhealthy food. Fats, such as cooking oil and lard (two cases), were also written this way.

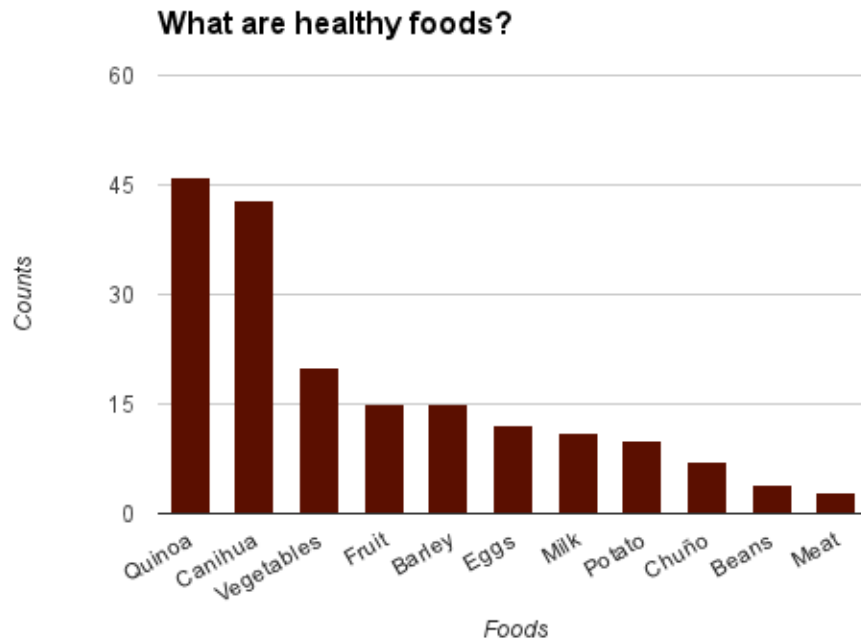


Figure 1: Healthy foods

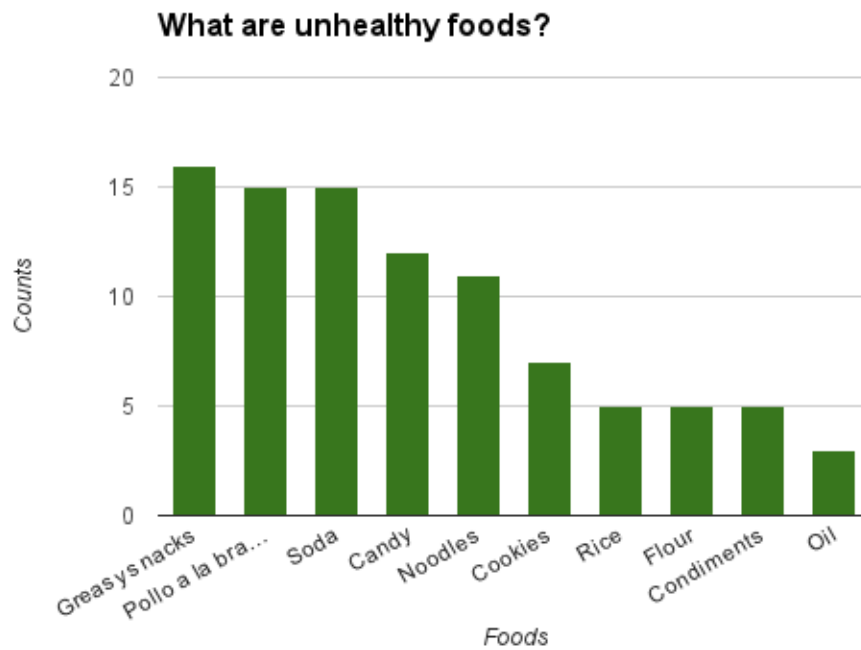


Figure 2: Unhealthy foods

### Food frequency questionnaire

Foods consumed at least weekly by 50% or more of households were potatoes (79.4%), *chuño negro* (78%), bread (75%), vegetables (73.6%), fruit (73.5%), rice (72%), sugar (66.2%), noodles (63.2%), meat (57.3%), oatmeal (55.9%), and cooking oil (52.9%).

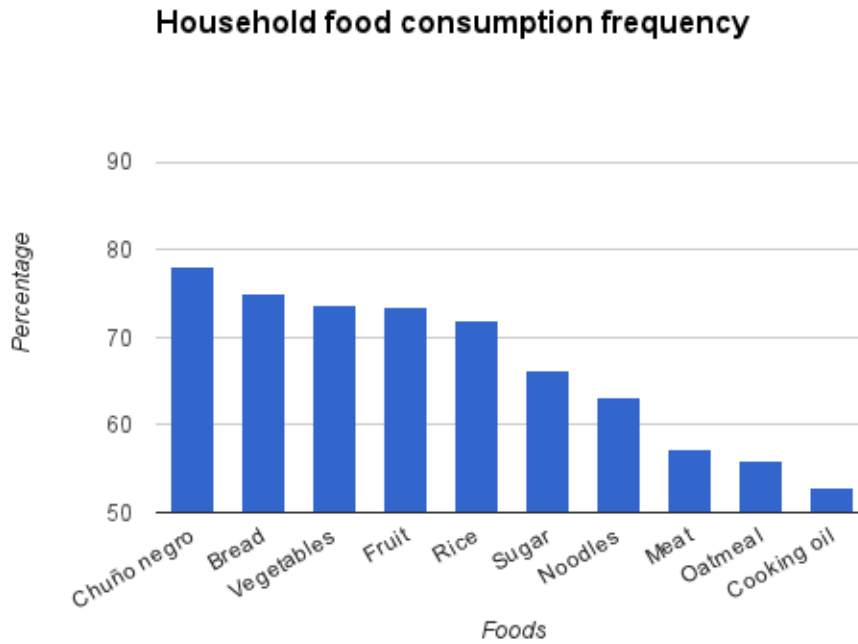


Figure 3: Household food consumption frequency

By contrast, foods eaten less than monthly or never by 50% or more of households were *chuño blanco* (64.7%), fish (75%), lard (92.7%), candy (79.4%), cookies (82.3%), soda (91.1%), and potato chips (91.1%) The “other” category was usually left blank (80.9%), though five families wrote in lentils, five families wrote in broad beans, and one family wrote in gelatin. Two families wrote in coca.

## 24-hour Recall

Our units of measurement were not standardized so it does not allow us to calculate macro and micronutrient intakes; however, they still offer some insight into how food is currently consumed in a household. Informants were asked to list everything they ate for breakfast, lunch, and dinner, whether they ate any fruit or other snacks, and if they drank any beverages.

### 1. Breakfast

Foods chosen for breakfast varied from nothing at all (4%), to bread and *mate* (3%), to complex dishes such as stews (15%) and soups (13%). The most common food was oatmeal (19%). Liquids were included in 53% of breakfasts, most commonly as *mate* (42%) and milk (42%). Milk was often paired with oatmeal or rice, so it is possible it was included in those dishes instead of consumed as a beverage. In only one case was it paired with a dish (stew) that excluded the possibility of it being an ingredient in that dish. The most common individual meal ingredient frequency broke down as the following: bread (32%), fresh potatoes (25%), eggs (21%), quinoa (13%), rice (13%), and *chuño* (12%).

### 2. Lunch

Soup accounted for 51% of lunches. The second most common dish was stew at 16%. The most common individual meal ingredients were fresh potatoes (50%), *chuño* (38%), meat (28%), quinoa (13%), rice (13%), and noodles (13%). Almost no beverages



were reported: *mate* was reported twice, water once, and soda once. Five people skipped lunch.

### **3. Dinner**

Soup accounted for the most dinner dishes (18%) followed by oatmeal (13%) and porridge (12%). Bread was the most common individual ingredient (35%) followed by fresh potatoes (13%). Beverage consumption was much higher for dinner with *mate* drunk at 32% of meals. Three people skipped dinner, two of whom had also skipped lunch.

### **4. Fruit, Snacks and Other Beverages**

When asked about fruit consumption 85% said yes, 38% of whom did not specify further. Oranges were the most commonly eaten fruit (21%) followed by bananas (13%), and apples (13%). Sixteen per cent reported that only their children ate fruit. Most informants reported no other snack consumption between meals (84%). Coca was the only other item specified (16%). Beverages reported as being consumed between meals were *mate* (38%), water (12%), and soda (12%). Alcohol was only reported once as beer and 4 times (6%) as *chicha*, the local corn beer.

While amounts of each food were not consistently reported, it is possible to average ratios of macro and micronutrients. Averaged together, all dietary recalls were 70% carbohydrate, 14% fat, and 16% protein.

### SES, food security, and dietary diversity

Table 3 presents the results of the T-test for specific food item consumption by SES.

Table 3: SES profiles

	Low SES			High SES			Sig.*	Df
	N	mean	St dev	N	mean	St dev		
Family size	36	3.28	1.34	30	3.93	1.53	.069	64
Soles spent on food per week	25	28.92	14.79	23	51.70	35.52	<b>.008</b>	29
Food item consumption:								
Potatoes	29	3.17	.60	30	3.27	.58	.544	57
<i>Chuño negro</i>	28	3.11	.42	30	3.00	.53	.395	56
<i>Chuño blanco</i>	16	1.75	1.39	27	1.63	1.28	.774	41
<i>Isano</i>	19	2.68	.49	29	1.48	1.40	<b>.000</b>	37
<i>Papa lisa</i>	18	1.83	1.25	27	1.70	1.27	.737	43
Meat	26	2.73	.53	28	2.75	.70	.91	50
Milk	26	2.31	1.26	28	2.64	1.03	.291	48
Fish	16	.56	1.03	28	1.18	1.09	<b>.071</b>	33
Cheese	21	1.95	.97	29	2.55	1.06	<b>.046</b>	48
Eggs	29	2.79	.68	29	3.00	.76	.276	55
Vegetables	28	2.80	.57	29	3.31	.54	<b>.001</b>	55
Wheat, barley, corn	21	2.52	1.03	27	1.89	1.37	.073	46
Quinoa	26	2.65	.49	27	2.48	.94	.402	40

<i>Cañihua</i>	26	1.65	1.38	26	1.12	1.28	.151	50
Fruit	27	2.85	.66	29	3.17	.60	.064	53
Bread	29	3.14	.83	27	3.59	.64	<b>.026</b>	54
Rice	28	2.93	.72	28	3.04	.64	.557	54
Noodles	25	2.84	.80	28	2.80	1.00	.827	50
Flour	27	2.48	1.10	27	1.70	1.54	<b>.037</b>	47
Sugar	24	3.21	.72	29	3.03	1.20	.513	47
Oats	27	2.56	.85	26	2.81	.90	.297	51
Cooking oil	27	2.74	.98	28	2.86	.80	.634	50
Lard	18	.61	1.20	27	.15	.60	.142	23
Snack foods	18	.39	.916	27	.48	1.09	.768	43

\*T test scores indicating that the two samples were significantly different in consumption of an item (<.05) are bolded.

Low and high SES households are significantly different in how much money they spend on food weekly (28.92 soles for low and 51.72 for high), their consumption of another potato-like root vegetable called *isano* (several times a month for low and less than once a month for high), fish (virtually never for low and rarely for high), cheese (almost once a month for low and several times a month for high), vegetables (several times a month for low and several times a week for high), bread (weekly for low, several times a week for high), and flour (several times a month for low and less than once a month for high).

Frequencies for each question on household food insecurity are displayed below in table 4.

Table 4: Household food insecurity responses

Frequency	Q1: Fear about insufficient food (n= 55)	Q2: Had to eat less (n=61)	Q3: Had to eat fewer meals (n=60)	Q4: Gone to be hungry (n=59)	Q5: Gone a day without eating (n=57)
No	45.5%	49%	57%	54%	74%
Sometimes	20%	15%	18%	20%	12%
Yes	34.5%	36%	25%	26%	14%

Based on these five questions, each household’s food insecurity score was tallied. The scores ranged from 1, most food secure, to 10, least food secure, with a mean of 3.15 and a median of 1. A Pearson product-moment correlation coefficient was computed for household food insecurity score and each food item in the FFQ. Significant positive correlations (consumption was higher in food insecure households) were found with *chuno blanco* (.422,  $p<.05$ ), *isano* (.393,  $p<.05$ ), *cañihua* (.319,  $p<.05$ ), flour (.341,  $p<.05$ ), and cooking oil (.442,  $p<.01$ ). A negative correlation existed with vegetables (-.251), but was not significant. This last correlation may have been more related to rural vs. urban locations than conscious choices made by impoverished households.

As expected, food insecurity scores and SES had a strong negative correlation (-.532,  $p<.01$ ). However no significant correlations were found between household food insecurity scores, income, and soles spent per household member per week, although the direction of the correlations was negative.

Cross-tabulation with occupation and food insecurity scores did not produce any significant relationships, though all 4 households with a score of 10 participated in wage work (though distinguishing further between secure and insecure types of jobs would be

useful for future studies). A score of 0 existed in every work category. Of the 20 households participating in agriculture, 12 had scores of 0 and 17 had scores of 5 or below. Six out of eight households participating in pastoral work had score of 5 or below. Four out of 6 households participating in commercial work had a score of 0.

To analyze dietary diversity, FFQ item totals were counted for each household. Of the 27 items listed in the survey, households had consumed on average 15.97 foods in the proceeding month at least once. Items were also categorized into potato products (fresh potatoes, *chuño negro*, *chuño blanco*, *isano*, and *papalisa*), meats (animal meat and fish), dairy (milk, cheese, and eggs), grains (wheat, barley, corn, quinoa, oats, and *cañihua*), processed/non-traditional carbohydrates (bread, rice, noodles, and flour), and snacks (candy, cookies, soft drinks, and potato chips). Each item in a category was then assigned a 1 if it was consumed in any quantity and a 0 if never consumed (thus the category “potato products” had five items in it and could give a household a score between 0 and 5). Vegetables, fruits, cooking oil, and lard were all kept as their own separate categories. Dietary diversity in the meat category had a significant positive correlation with SES (.319,  $p < .05$ ) while the processed carbohydrates category had a significant negative correlation (-.355,  $p < .05$ ). Dietary diversity in the potato product category had a significant positive correlation with food insecurity score (.464,  $p < .01$ ), as did processed carbohydrates (.348,  $p < .05$ ). This would seem to suggest that provisioning large amounts of potatoes and consuming large amounts of rice, noodles, bread, and flour are major responses to food insecurity. One food security strategy observed in the 1980s was poorer families producing or acquiring nutritionally dense foods like meat and eggs to sell so

they could purchase larger amounts of cheaper calories. We are likely seeing this same pattern continuing in 2012.

Table 5: Diet diversity categories correlated with SES and Food Insecurity Scores

Food category	Correlation with SES	Correlation with Food Insecurity Score
Potatoes	-1.65	.464 (p<.01)
Meat	.319 (p<.05)	.105
Dairy	.178	.061
Grains	.001	.145
Processed carbohydrates	-.355 (p<.05)	.348 (p<.05)
Snacks	.05	.09
Total diet diversity	.085	.319

### **Trends Through Time**

Examining previous diet surveys from 1967 (Gursky) and 1984 (Leonard and Thomas) allows us to map changes in food access and availability onto the changing economic and political environment. The previous studies within Nuñoa make it easier to answer questions about when certain changes began and what their long term effects have been. The general trend has been one of increased market integration with a decreased reliance on locally-produced foods. The following graph shows the percent of families consuming a series of food items that were surveyed and consumed in all three studies.

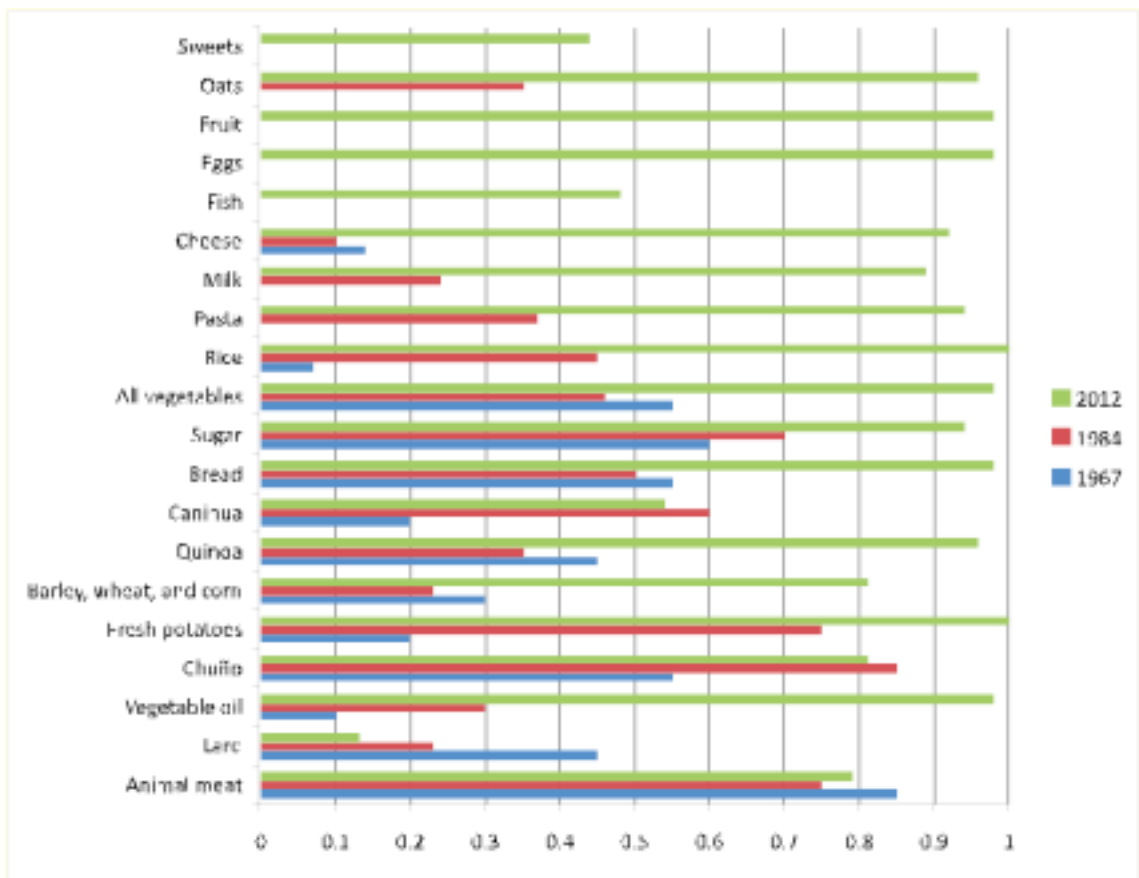


Figure 4: Percentage of households consumed specific food items over time

The number of food items listed between 1967 and 1984 increased by three; it then increased again by 4 in 2012 (7 more items consumed in 2012 over 1967). This does not imply that there was no fruit or processed candy to speak of in 1967 or 1984, but instead that their prevalence was negligibly low and did not contribute significantly to household diets (both datasets listed only foods consumed by at least 20% of households in at least one field site as a cutoff for inclusion).

Prevalence of existing food items increases in almost every category with all but three in 2012 being consumed by over 50% of households. The notable exception to this trend is lard, which has been replaced by vegetable oil. Fresh potatoes are artificially low

in the 1967 dataset due to a potato famine the preceding year. The items cheese, rice, and vegetable oil have grown steadily from rare use in 1967 to common use in 2012. Other items that were not included in one or both of the earlier datasets, such as oats, fruit, eggs, milk, and pasta, show an even more pronounced increase in consumption. This suggests that the current dietary diversity among households is a relatively new trend and still continuing to increase.

Only the 1984 dataset looked quantitatively at the effects of seasonality on diet composition within households. Leonard and Thomas (1988) saw a dramatic shift in the consumption of fresh tubers from 13% of total calories pre-harvest to 40% post-harvest. Conversely, *chuño* went from 11% pre-harvest to 4% post-harvest. Animal products increased in consumption post-harvest, while dry, easily stored foods like flour were preferentially consumed pre-harvest. Thus seasonality still played an important role in diet composition during that time period. By comparison, survey responses from 2012 suggest that seasonality may be decreasing in importance since 31% of households perceived no seasonal difference in diet. This is probably due to increased reliance on wages and market foods replacing self-provisioning agriculture as people move out of rural areas into the center of town. The current 2012 study was administered during the post-harvest and therefore should be most comparable to that portion of the 1984 dataset.



Table 6: Disparity between SES levels in food item consumption in 1984 and 2012

	1984 (post-harvest)		2012	
	% of diet of low SES households	% of diet of high SES households	Consumed at least once/week by % of low SES households	Consumed at least once/week by % of high SES households
Fresh potatoes	44.6	30.7	90	93
<i>Chuño</i>	5.5	0	96	86
Rice/Pasta/Oats	7.5	23	77	81
Flour	8.9	0	59	44
Bread	5.5	13.5	90	93

While the types of measurements shown for 1984 and 2012 in table 6 are not the same, they allow for us to look at types of disparity between households of low and high SES. The numbers for 1984 show the percentages of calories that came from particular foods during the post-harvest. There are clear differences in the kinds of foods that low SES families choose to rely on when food is more abundant: fresh potatoes, *chuño*, and flour all contribute more calories than they do in high SES households. Neither *chuño* nor flour were consumed at all in high SES households, which relied much more heavily on rice, pasta, oats, and bread. The rows for 2012 do not tell us what percentage of calories came from each food, instead showing what percentage of households ate an item at least once a week. Of note here is that the two foods that contributed zero calories to high SES household diets in 1984, *chuño* and flour, are consumed in at least some amount by 86% and 44% of high SES households in 2012. Both *chuño* and flour remained the only two

foods eaten less frequently by high SES households in 2012, suggesting that they are still favored by low SES households. For all other items, disparity in access to these major staples seems to have diminished significantly.

Leonard and Thomas found differences in consumption for certain foods along SES lines. *Chuño negro* was consumed by more poor families during the pre-harvest season (13% compared to 2% of middle class families), as was flour (16% compared to 9%, respectively). Wealthier households consumed a much wider range of market goods on a regular basis, especially grain products like rice, pasta, and oatmeal (Leonard and Thomas 1988). In the 2012 study SES correlated negatively with *isano*, flour, barley, and corn consumption, and correlated positively with vegetable consumption. *Isano*, flour, and vegetables correlated negatively with food insecurity scores. Clearly flour has remained a highly accessible food for poor families, as have some other grain products. However products imported from other regions, such as many vegetables, remain more accessible to better-off families. While both availability and access to different food items are increasing, they are not doing so at the same rate. Many foods that show up in abundance in the markets of Nuñoa are not consumed by lower class households.

### **Marketing and processed foods**

In general, our observations through dietary surveys in town suggest that Nuñoa continues to see increased market integration, as well as other technological connections to the rest of the region and country. Since its establishment in 1972, the Sunday market has made the town an important commercial center for the district population. Roads have improved over the decades, increasing the ability to transport large amounts of

products in and out. Easier direct transport along the paved highway from Juliaca, where foods from the coast, tropical lowlands, and bordering countries come together, has facilitated the tremendous growth of food availability in Nuñoa over the past 30 years. Packaged foods and drinks, ubiquitously marketed and associated with more urban parts of Peru, are also now consistently available for consumption in town. For example, *Maltin Power*, a malt based energy drink for children, is popular among teenaged students we talked to. Its marketing campaign, like that of most energy drinks, is distinctly urban, filled with youth skateboarding down flights of stairs and playing soccer in giant stadiums.

Milk, which can come fresh, canned or transformed into other products like cheese, is the subject of pervasive marketing and new economic endeavors. *Vase de Leche*, a subsidy program established in the 1990s, delivers commodities to low income households with young children and pregnant women. Whether the program has lasting positive nutritional effects on children is unclear, but it is very successful at targeting poor households (Stifel and Alderman 2003).

Gloria, a brand of evaporated milk belonging to Carnation, has become a proprietary eponym and ubiquitous on the shelves of *tiendas*. Their marketing campaign, printed on the side of each can, declares “Three glasses of milk daily.” Their television advertisements are montages of happy, active, short children drinking milk and transforming instantly into tall children (grupogloria.com and <http://www.youtube.com/watch?v=OY3iZ7e2O58>). It is possible that in an area where height differences still correspond to some extent with nutritional wellbeing that such a marketing campaign would be especially successful.

Meanwhile a burgeoning dairy industry has sprouted in Nuñoa and the surrounding areas. In most cases individual herders align themselves with and sell their milk to a local cheese production cooperative or association. The resulting wheels of cheese are sold in *tiendas* in Nuñoa and in the giant tented markets and pizzerias of Cusco. Households and associations involved in dairying and cheese production are potentially seeing increased household production and greater economic stability (Leatherman et al 2013). Milk, in all its forms, is a relatively recent addition to the southern Andean foodscape, not even registering as a food item in Gursky's 1967 study, but it is now inextricable from the greater forces of development and Nuñoa's place within Peru.

### **Discussion**

In his chapter from *Man in the Andes* (1978) on food and nutrition, Picón-Reátegui describes a typical day of meals for an agricultural Andean family.

Breakfast is generally taken between 6:00 and 8:00 A.M., lunch between 12:00 noon and 2:00 P.M., and the evening meal from 6:00 to 8:00 P.M. When hot meals number only two, the evening meal is also served between 6:00 and 8:00 P.M. A very hot herb infusion is sometimes drunk early in the morning.

The diet in these communities is very monotonous. However, the diet does show some variation according to seasonal availability for foodstuffs. The thick soups (*masamora*) constitute the daily dish and are ordinarily served at all meals. Soups are prepared using either only one food product, generally chuño negro and sometimes moraya, or two or three products, such as quinoa, barley, wheat flour, and occasionally meat of alpaca or sheep (p. 213).

While this classic description continues to ring true for portions of our survey results, a lot more variety is also present.

In this survey 68% of households reported that they see a seasonal change in food availability; however, we see no correlation between food insecurity and seasonality, income and seasonality, or SES and seasonality. Possibly this is due to migration into town by the poorest families looking for wage labor-- whereas low SES and food insecurity would have meant unstable yearly harvest in decades past, they now instead mean unemployment. Responses to survey questions about employment and livelihoods show that most families engage in a large variety of types of work in order to support themselves. This appears to not have changed much since the 1980s (Leatherman 1994). However further surveys distinguishing between rural and urban households would be needed to verify this.

While specific amounts of food were not collected through the dietary surveys and we were thus unable to do a detailed breakdown of nutrients, it was possible to estimate macronutrient ratios at 70% carbohydrate, 14% fat, and 16% protein. This falls on the higher side of acceptable according to current recommendations (American Dietetic Association 2009). All essential nutrients were represented to some extent, suggesting that the population is not likely to suffer from any pervasive nutrient deficiencies.

The effect of programs like *Juntos* and *Vaso de Leche* on household SES is unknown. Interviews with local residents suggest that there is at least some social stigma with being a part of *Juntos*. In an unstructured interview a storeowner commented that the program is a way for lazy people to get out of doing any work.

One way that the changing relationships between diet, class, and identity can be examined is through how individuals categorize specific foods. In this survey we asked

respondents to list healthy and unhealthy foods, as well as gathered the opinions informally of some adults and teenagers. Households consistently identified healthy food as both traditional Andean foods, such as types of potatoes and quinoa, as well as fruits and vegetables, citing the former as a source of sustained energy and the latter as a source of vitamins and minerals. By contrast, *comidas chatarras*, “junk food”, were candy, cookies, and potato chips. Interviews with teenage students reveal that these foods, as well as other more recently introduced items high in fat and salt such as *lomo saltado*, *arroz chaufa*, and *pollo a la brasa*, are all favorite foods of children. Some individuals included “foods with too much fat” as *comidas chatarras*, but usually these were categorized separately. Store owners confirm that children come into stores before and after school every day to buy candy. This is not clearly represented in the FFQs, which may mean that the daily food choices of children outside of the home are either unknown to or unacknowledged by their parents. The close proximity of snack foods to school children via food carts and *tiendas* adds to the complexity of reading strategic food choices at the household level. In terms of global trends, there is nothing unique about children wanting and finding ways to eat junk food (for examples Leatherman and Goodman 2005; Brewis and Gartin 2006; Shortman 2010). However, the way access is changing may play a role in how this new generation thinks about food and identity and makes dietary choices.

This harkens to a potential generational conflict over food values. Weismantel has famously documented the different ways children and parents in the Andes can make meaning with new foods and create intergenerational and class tension in family foodways. In her work in Ecuador in the 1980s, bread is a non-traditional food that

children desire as a sign of modernity and parents struggle to afford. While the ability to feed children bread on a weekly or daily basis could be a source of pride, it is also a substitute for traditional foods such as barley gruel (*machica*) that parents perceive as healthier and markers of cultural identity (Weismantel 1989).

Graham paints a similar picture of connections of *misti* (*mestizo*) and *runa* (indigenous) foods and how they are used to express class identity (Graham 2003). For this she borrows her framework directly from Libbet Crandon-Malamud, who has applied medical diagnosis and healthcare choices to representations of cultural and economic identity (Crandon-Malamud 1991). Consistent across the frameworks developed by these scholars is the idea that small, daily choices, which are often not construed as meaningful choices, are directly related to conscious (or subconscious) desires and understandings about larger social relationships.

Decades later in Nuñoa, the categories that used to be strikingly clear are recombining in new ways, reaffirmed by nutritional information given out by governmental programs like *Juntos*, and product marketing. Our survey responses give no clear indication about food categories that relate directly to class or ethnic identities, although pieces of past categories remain. In some ways still, *chuño* and *papas fritas* are stark symbols of the old food ways and the new-- generationally and economically at odds. However the children that cried for bread during Weismantel and Graham's fieldwork are full grown adults now making choices about what to feed their own children. They grew up watching the tension between the old and new unfold, changing how and what they ate. Responses to survey questions about healthy and unhealthy foods show that there is no longer clearly a categorical difference between traditional/non-

traditional, or even local/non-local. Instead new hybrid healthy food groups have developed that include quinoa, some types of potato and a large array of new fruits and vegetables. Still, none of the unhealthy food groups reported by households contained any traditional foods. Social marketing via radio and other media also have a clear impact on local opinion.

This study does not examine differences between urban and rural communities, as previous studies have done. However such studies have demonstrated that economic changes may affect the diets and health of different communities in different ways. Future work should try to make a direct comparison to the urban-rural comparison study completed by Leatherman (1994) in order to examine how milk production, along with other production and consumption, shifts in urban and rural communities is associated with household economy, diet, and health.

### **Conclusions**

These data show how an increasing range of food products have begun to be integrated into the area in the last 20 years. Comparison to past dietary studies in Nuñoa show that the number of food items available has more than doubled since the 1960s, especially in terms of imported processed foods. Along with availability, accessibility is also increasing, at least for some sorts of foods. However, a discernible divide in dietary diversity along class lines still exists. It is perhaps remarkable that despite development, patterns of food insecurity first documented in the 1960s continue. As Peru continues to grow as a nation, these markers of inequality run the risk of becoming invisible if they are not highlighted and addressed.



In this study, socioeconomic status and food insecurity have a significant inverse correlation. Evidence of this can be seen in the market place where certain foods, although available for purchase in ever-increasing quantities, are less accessible to poor households. Other foods, especially high carbohydrate foods like potatoes, rice, noodles, and flour, are consumed in higher quantities by poor households. As more people migrate into town from rural areas in search of wage labor, they become increasingly reliant on what they can purchase and less capable of provisioning subsistence crops. Thus while in decades past a poor rural family might still be able to bring in a good harvest and provide itself with sufficient nutrition, upon moving into town they become more alienated from their food supply and at the mercy of what the market will offer them.

Changes in Nuñoa will undoubtedly continue to increase market integration and have profound impacts on health. What exactly those impacts will be remains to be seen. Continued research in the area will be useful not only for the area itself but also for creating a model for how other regions with similar social and economic environments are likely to respond to development.

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