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Ann V. Millard
Major professor

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DIMENSIONS OF MALNUTRITION AND HUNGER AMONG CHILDREN IN AN ANDEAN COMMUNITY

By

Margaret Anne Graham

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ABSTRACT

DIMENSIONS OF MALNUTRITION AND HUNGER
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This study examines the multiple dimensions of malnutrition and hunger among preschoolers in the Andean peasant community of Ura Ayllu, Department of Puno, Peru. It explores child nutrition in relation to seasonal fluctuations in food availability and to parental behavior and food allocation within the household. Both nutritional (food weighing and anthropometry) and ethnographic (participant observation and informal interviews) methods were used to collect data for this study.

Food intake data obtained at three points in the agricultural cycle illustrate that the diet is linked to agricultural production and reflects seasonal changes in the availability of food. Nutrient analyses indicate that children's energy intake is adequate for most, but not all, of the year. Anthropometric measures show evidence of chronic malnutrition, with height-for-age being relatively more depressed than weight-for-age. The results suggest that dietary deficits play only a partial role in the growth patterns observed among young children in this community.

The ethnographic analysis indicates that seasonal hunger is a matter of parental concern in regard to young children. In contrast to older children and adults, young children are viewed to be unable to cope with hunger. Parents act to protect them from it through the preferential allocation of food. Changes in household resources of food and cash during the pre-harvest months impinge on socially-sanctioned food provisioning among poorer households.

This study concludes that hunger cannot be understood strictly in terms of physical measures and biological drives. In this community, hunger among children is produced when ecological and economic factors clash with cultural prescriptions of adequate child care and appropriate diets. Young children are not discriminated against when food resources are constrained. This study raises questions about children's status within the household and the presumed subordination of their interests to those of adults.

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CHAPTER ONE

INTRODUCTION AND THEORETICAL CONSIDERATIONS

Introduction and Statement of the Problem

> Seasonal hunger may be a silent problem, and hence it often goes unperceived, but it is no less real for those who suffer from it (Watts 1981:206).

Dramatic images and hard statistics created by the global hunger crisis have greatly increased our awareness of "hunger in the midst of plenty." The scenes and figures bombard us and force us to question the causes of this tragic contradiction. They confront us with the various forms of hunger--the acute form associated with famine and large-scale ecological disaster, and the chronic form associated with the "silent crisis" of long-term malnutrition--and show us that in many instances hunger is less a product of food supply than food distribution. The fact that poverty lies at the root of hunger makes it a contentious political, as well as a humanitarian, issue. Hunger also has important physiological and not least, personal, dimensions.

The statistics and images are effective in illustrating the prevalence and magnitude of the problem, but they can also "distance us from what is actually very close" (Lappé

and Collins 1986:3). Perceptions of hunger as being "distant" and "silent" are, in part, the result of methodological biases[1] which hinder long-term study and close personal contact between researchers and the poor (Chambers 1983). These biases, in addition to the emphasis on quantitative data, often obscure the very issues we wish to elucidate. While researchers working on food, nutrition and hunger have, in recent years, heeded the call for long-term study (i.e., Abdullah and Wheeler 1985; Hassan et al. 1985; Hussain 1985; Leonard 1987; Pagezy 1984; Schofield 1974; Spencer and Heywood 1983; Valverde et al. 1982), our images and interpretations of malnutrition and hunger are still expressed almost exclusively in terms of nutrients, body measurements, and other impersonal statistics. For the most part, the voices needed to break the silence, those who experience and try to cope with hunger, are still lacking.

The purpose of this dissertation is to examine the multiple dimensions of malnutrition and hunger among young children in a rural Andean community in southern Peru. The focus is on seasonal hunger, the regularly occurring form associated with annual fluctuations in household resources. This type of hunger rarely draws attention but it is experienced by many agricultural communities in the Third World. In this research I explore how seasonal fluctuations in food availability affect the diet and nutritional status

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[1] See section on seasonality and nutrition (below) for more details on these biases.

of young children vis-a-vis child feeding practices and the intra-household allocation of food. Moreover, I explore the ways in which people perceive and experience seasonal scarcity and hunger. A combination of methods--both quantitative and ethnographic--were used to collect data for this study. Research took place in Ura Ayllu, a farming community of some 700 people located in the Cuyo Cuyo District, Department of Puno, Peru.

Conceptual and Methodological Issues

Before proceeding it is necessary to distinguish dietary intake and nutritional status. Nutritional status is "the physical expression of the relationship between an individual's dietary intake, the bioavailability of these ingested nutrients, and his or her physiological requirements" (Brown 1984:69-70). Malnutrition is defined in this study as the state of undernutrition and occurs when the human organism takes in insufficient nutrients for performance, growth, development, and biological functions. Dietary intake, on the other hand, is only one of several factors that influence nutritional status (infection, physiological state, and genetics are others) and, therefore, cannot alone determine whether or not an individual is malnourished. In this study I measure both dietary intakes and nutritional status. The adequacy of children's diets is measured by the intake of calories (energy) relative to individual needs. Nutritional status

is measured by anthropometric parameters (weight and height relative to age and sex) because they show the result or outcome (i.e., growth) of the myriad factors which affect an individual's state of nutrition.

I chose young children (ages two to six years) as the focus of this study for a number of reasons. First, early childhood is a vulnerable and precarious phase of life in many Third World, peasant populations. Nutritional and health problems may be severe during the first several years of life and often lead to death (Martorell et al. 1985:8-9). These problems are related to the greater nutritional requirements of young children relative to those of older children and adults, and to young children's higher susceptibility to infection (ibid.). Evidence of the precariousness of early life is seen in mortality rates as discussed below.

Second, young children represent a socially ambiguous category of person or household member, particularly in the social science research literature (see Thorne 1987 for discussion). In the short term, young children are accorded the status of "non-producers"; as full-time consumers, they are perceived to draw on household resources with very little return. Children, however, also hold long-term or future economic promise. Children grow up to become full-time household producers and represent future economic security to elderly parents. Thus, children represent both short-term losses and long-term contributions to the

household and as such their status is equivocal. Researchers have interpreted the problem of malnutrition in children in this way, but this research raises questions about their characterization. This issue also is addressed in more detail below.

My research was carried out in conjunction with the "Production, Storage and Exchange" (PSE) research project directed by Dr. Bruce P. Winterhalder of The University of North Carolina. The central focus of the PSE study was to examine adaptive household responses, especially diversified production, storage and exchange, to a highly differentiated and often unpredictable or risky environment. Fieldwork for the PSE project was conducted in two communities--Ura Ayllu and Puna Ayllu--in the District of Cuyo Cuyo from June 1985 to March 1988, and I participated in data collection from the beginning of the project until August 1986.

For the PSE study, detailed information on agricultural production, storage, time allocation, and material flows (income and expenditure) was collected on twenty households (ten from each community) throughout the course of the study period. In addition, spatial and temporal environmental data on each of the communities were gathered. Preliminary analyses of data gathered for the PSE project, particularly those on climate, agriculture and time allocation, are included in this dissertation to provide descriptive information on the community. These analyses are cited where they appear.

Child Mortality

Child mortality rates[2] are often used as indicators to measure the well-being of young children as well as the health of national economies (UNICEF [United Nations Children's Fund] 1990). The causes of childhood mortality are numerous (e.g., infection, malnutrition, inadequate access to health care, sanitation and potable water) but lying at the root of each of these problems is poverty. The increasing impoverishment of many less developed countries [LDCs] in recent years can be tied to the debt crisis and structural adjustment policies. According to UNICEF,

> the governments of the developing world as a whole have now reached the point of devoting half of their total annual expenditures to the maintenance of the military and the servicing of debt. These two essentially unproductive activities are now costing the nations of Africa, Asia, and Latin America almost $1 billion every day, or more than $400 a year for each family in the developing world (UNICEF 1990:1; emphasis in the original).

The restructuring of economies to meet debt and interest payments often results in drastically reduced expenditures for health, education, food, and water. In LDCs the burden of debt, poverty, and ill health falls heaviest on children in the early years of life and is evident in child deaths (UNICEF 1990; Millard 1985:589; PAHO [Pan American Health Organization] 1985).

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[2] Child mortality is defined for the purpose of this study as the number of children who die before the age of five for every 1,000 live births. UNICEF uses the term under-five mortality rate. Under-five mortality rates encompass the span of early-life mortality, from infancy through weaning (see Millard 1985).

According to UNICEF estimates in 1988, Peru has a high child mortality rate (123), surpassed only by Bolivia (172) and Haiti (171) among the Latin American nations (see Table 1.1). The 1988 estimates indicate, however, that child and infant mortality have decreased since 1960. Despite apparent improvements in the survival rates of young children, mortality rates continue to be high relative to other Andean nations such as Ecuador and Colombia.

How much do these indicators really tell us about the health status of young children? First, national-level statistics provide an average mortality rate and, thus, obscure the variation in deaths among different regions and socioeconomic sectors within a country. For example, an examination of infant mortality rates for the Cuyo Cuyo District show much higher rates than that estimated by UNICEF for the whole of Peru. Table 1.2 indicates the infant mortality rate in Cuyo Cuyo is 241.6 for the six-year period between 1981 and 1986; that is, nearly one in every four children died before the age of one. Comparing Table 1.2 with Table 1.1 indicates that the Cuyo Cuyo rate is three times higher than the national-level infant mortality rate of 87 estimated for 1988 by UNICEF (Table 1.1, column four). Thus, local-level estimates provide a very different picture of infant mortality than do the country-wide average. In general, mortality rates in the sierra region of Peru are higher than those for the more urbanized coast (Ortiz Martínez 1983:60).

Table 1.1

Comparison of Child and Infant Mortality Rates of Selected Nations

Country	CMR[a] 1960	CMR[a] 1988	IMR[b] 1960	IMR[b] 1988	UNICEF Rating[c]
Afghanistan	380	300	215	171	V. high[d]
Mozambique	330	298	190	172	V. high
Niger	320	228	191	134	V. high
Bolivia	282	172	167	109	V. high
Haiti	294	171	197	116	V. high
PERU	233	123	142	87	High
Ecuador	183	87	124	62	Middle
Colombia	148	68	93	46	Middle
Chile	142	26	114	19	Low
USA	30	13	26	10	Low
Finland	28	7	22	6	Low[e]

Source: UNICEF 1990:76-77.

[a] Child mortality rates are defined as the number of deaths of children under the age of five per 1,000 live births.

[b] Infant mortality rates are defined as the number of deaths of children under the age of one per 1,000 live births.

[c] UNICEF rating: Very High = CMR (under five mortality rate) over 170 (per 1,000 live births); High = 95-170; Middle = 31-94; Low = 30 and under.

[d] Highest CMR in the world.

[e] Lowest CMR in the world.

Table 1.2

Infant Mortality Rate (IMR)[a], District of Cuyo Cuyo[b]

Year	Total Births	Total Deaths < Age 1	IMR
1987	263	43	163.5
1986	268	76	283.6[c]
1985	305	72	236.1[d]
1984	251	61	243.0
1983	285	68	238.6
1982	271	62	228.8
1981	269	59	219.3
1980	278	37	133.1
1979	224	38	169.6
1978	273	32	117.2
		Ten Year Average, 1978-1987	203.2
		Six Year Average, 1981-1986	241.6[e]

[a] Infant Mortality Rate is defined as the total deaths of children under one year of age, divided by the total number of live births, expressed as rate of 1,000 live births.

[b] Recorded from District of Cuyo Cuyo death registers and death certificates. These figures are most likely lower than actual numbers, since neonatal deaths (deaths of children under one month of age) often go unreported, both at the informal (family) and official (District) levels.

[c, d] 1986 and 1985 statistics are the most accurate, since death certificates were cross-checked with death registers for these two years. A number of neonatal deaths found on death certificates but not in the birth and death registers were added to both birth and death totals for these years. These data are probably lower than actual totals, however, since many neonatal deaths go unreported.

[e] The average for the years 1981-1986 is more accurate than the ten-year average, since in these years, at least some neonates were recorded in the death registers. For the years 1978-1980 and 1987, no unnamed neonates were listed in the death registers.

Second, the indicators say little about the causes of malnutrition, poor health, or mortality. A number of researchers have proposed causal models to explain malnutrition and mortality in children (Martorell et al. 1985; Millard et al. 1990; Mosley and Chen 1984). These models illustrate a multi-causal, interlinking web of factors that influence child feeding practices and ultimately the nutritional and health status of children. Factors ranging from the biological (micro-level) to the political-economic (macro-level) all have an effect on children's diet and health status. The present research examines one of the threads of causation, namely the relationship of children's dietary adequacy and nutritional status to seasonal food fluctuations, child feeding and intra-household food distribution.

Seasonality and Nutrition

Researchers recently have examined the issue of seasonal change in rural societies and have shown that seasonality has an impact not only on food production and consumption but on demography, disease, wage labor, and market prices (see Chambers 1981, 1983; de Garine and Harrison, eds. 1988; Huss-Ashmore et al., eds. 1988; and Sahn, ed. 1989 and articles therein). Chambers (1983) has been an outspoken critic of academics and development practioners who he claims are guilty of underperceiving rural poverty. He cites six biases that impede outsider's

contact with rural people. Among these biases is what he refers to as the dry season bias, the time of the year when food is abundant, weather is favorable, transportation is easy, and temperate-zone academics and agency personnel are most likely to be visitors. Research restricted to this time of the year effectively shrouds our knowledge of rural societies at other times of the year when food supplies may be low, prices high, and morbidity, mortality and malnutrition on the increase; in other words, the time of the year when people are most deprived. My research was designed to follow households over the course of an annual cycle, in good times and in bad, and thus to illuminate the impact of seasonality on this very issue.

People whose livelihoods are dependent upon agriculture are influenced by annual fluctuations in rainfall and temperature. This is the situation for many rural Third World communities, like Ura Ayllu, that do not have irrigation facilities and are dependent upon rainfall for agriculture. Climatic seasonality affects the growing and harvesting of crops, and the scheduling and intensity of both agricultural and off-farm labor.

Seasonal fluctuations in the food production cycle are reflected also in the supply of food resources available to households for consumption. In areas like the Andes where the climatic pattern is unimodal, the year is divided into two distinct seasons--wet and dry--and crops are planted annually (Thomas and Winterhalder 1976; Walsh 1981). Under

this pattern, food supplies and consumption are expected to peak after the harvest, during the dry season, and ebb during the wet pre-harvest season (Hussain 1985; Schofield 1974). It is during the pre-harvest or "hunger" season when low food supplies coincide with peak labor requirements and high market prices (for replacement foods) and when, according to Chambers (1981:5), "poor people are kept poor and...when they become poorer." It also is the time when diets are inadequate and nutritional risk is high (McLean 1987).

Andean residents are not strangers to food crises. In the altiplano region of Puno Department, not far from Ura Ayllu, recurrent cycles of drought and flood plague the area, destroying crops and killing livestock. In this harsh high altitude region, rainfall can be unpredictable and heavy frosts may have disastrous effects on agro-pastoral production, even in the best of times.

Tracing a ten year period from 1956 to 1965 in the altiplano shows the magnitude of the problem (Dew 1969). There were serious droughts in 1956, 1957, and 1964; serious floods in 1962; and in 1960 and 1963 there were February floods followed by severe frosts and a premature end to the rainy season. In 1965 there were heavy rains that flooded parts of the Titicaca Basin. Thus, over a ten-year span, altiplano residents experienced only three years (1958, 1959, and 1961) of "normal" climatic conditions.

Again in the 1980s Puneños experienced another cycle of disasters. In the early 1980s--1982-1984--the altiplano was in the midst of a disastrous drought. Pictures of deeply-cracked fields and emaciated and dead livestock were featured frequently on the covers of national newspapers and magazines. Livestock that did not die were sold off for cash. The more sensationalist press published horrifying stories of mother's attempts to sell their young children in order that they might survive. The altiplano had begun to recover their resources in 1986 when heavy rains flooded Lake Titicaca basin and the tributaries that feed into it. Roads were cut off and villages stood under several feet of water. The region is currently (as of the end of January 1991) in the midst of another drought and recent figures estimate that the drought has destroyed 75 percent of crops in the Sierra region (Latin American Weekly Report 1991).

These recurrent crises are not just a feature of modern-day Puno but have affected its economic, social and political life for many years. For example, Recharte discusses the history of the Sandia Valley, where this study was carried out, from Colonial times onward and states that large waves of altiplano residents (from the Azangaro region particularly) migrated into the valley in the late 19th and early 20th centuries to seek refuge from both droughts and forced labor arrangments in the wool haciendas (1990).

Disastrous food crises caused by major climatic events such as droughts and floods are part of the memory of the

Ura Ayllu residents in this study, who live at a lower altitude than the harsh altiplano. But severe crises do not seem to be regularly recurring phenomena in the valley. Although the people of Ura Ayllu are aware of the periodic crises of the altiplano, their year-to-year experience is one of seasonal fluctuations in resources that commonly accompany the agricultural and labor migration cycles on an annual basis. This annual fluctuation forms the context of food shortage and hunger in this study.

Previous studies on diet and nutrition in the Peruvian Andes have indicated that diets are seasonally variable and nutritionally marginal (Collazos et al. 1954. 1960; Ferroni 1982; Gursky 1969; Leonard 1987, 1989b; Leonard and Thomas 1988, 1989; Marquis 1984; Marquis and Kolasa 1986; Mazess and Baker 1964; Orlove 1987; Picón-Reátegui 1976, 1978; Thomas 1973).[3] The majority of these studies, however, were conducted during a single phase of the annual cycle; only three researchers specifically examined the seasonal nature of dietary intakes (Collazos et al. 1954; Thomas 1973; and Leonard 1987). Each of these three studies demonstrate that energy intakes follow the expected seasonal pattern: uniformly higher intakes during the post-harvest season than during the rainy pre-harvest seasons for all age-sex groups (ibid.).

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[3] Cultural analyses of Andean food and diet may be found in Allen (1988), Johnsson (1986), Ossio (1988), Meyerson (1990), and Weismantel (1988a).

Recent research in Nuñoa, a highland community located in the altiplano region of Puno, indicates that seasonal nutritional stress is experienced differentially within the population (Leonard 1987, 1989b). This research suggests that children are less affected by seasonal food shortages than adults. Leonard's research demonstrates that energy intakes of children under the age of 13 exhibit less seasonal change (10-15 percent) than adults, ages 20 years and older, (30 percent) and that pre-harvest energy consumption was adequate (relative to predicted needs) only among the children (Leonard 1989b:599). This finding challenges the prevailing view that children experience the brunt of seasonal stress because limited resources are preferentially allocated to "productive" household members (Minnis 1985; Schofield 1974). My research concurs with the findings of Leonard (1989b) that mothers take active steps to protect their children from seasonal food deficits that may affect other family members.

Leonard also found that seasonal energy intakes varied according to socioeconomic status (Leonard 1987; Leonard and Thomas 1988). Socioeconomic differences in per capita energy intakes were statistically significant for the pre-harvest season but not for the post-harvest season. In other words, the lower and higher economic groups are consuming similar amounts of calories during the post-harvest season; however, during the pre-harvest season, energy intakes of the poorer group are significantly lower

than those of the wealthier group. Analyses also indicate that seasonal energy intakes among adults vary by 29 percent for the lower economic group and only 3 percent for the higher economic group. Thus, it appears that poorer households in Nuñoa are more affected by seasonal changes in food availability apparently because of the lack of sufficient cash income to supplement the diet when local food supplies are low.

The observation that seasonal risk is a salient feature of rural livelihoods has prompted a number of researchers to explore how households plan for and respond to seasonal food shortages and famine (Colson 1979; Corbett 1988; Dirks 1980; Messer 1989a,b; Longhurst 1986; Ogbu 1973; Thomas and Leatherman 1990). Household responses have been categorized into sequential stages that have varying consequences for current and future household survival (Thomas and Leatherman 1990; Corbett 1988). In the first stage, established insurance mechanisms (e.g., diversified production, storage, commensuality systems, temporary out-migration) and dietary adjustments (e.g., fewer meals, use of less-preferred foods) smooth out seasonal food shortages and preserve important household assets. Depending upon the economic situation of a household or the duration of food crisis, households may enter into the second stage which involves the disposal of productive assets such as animals and land, or entry into unfavorable credit relationships that may have long-term consequences for household economic security. The third

stage occurs when households are destitute and without assets and leads to distress migration in search of relief.

In sum, research on seasonality has increased our knowledge of many rural societies over the last decade. Rural livelihoods are not constant but can be affected by the interaction of annual fluctuations in climate, food, income, labor requirements, and market prices. These factors can be mutually reinforcing and may lead to regular periods of increased poverty, ill-health, and malnutrition in some households.

Allocation of Food to Children

As noted in the previous section, household food availability may influence the ways food is prepared and allocated to household members. The differential distribution of malnutrition between adults and children has led to several studies exploring the intra-household allocation of food (Abdullah 1989; Abdullah and Wheeler 1985; Lipton 1987; Pelto 1987; Van Esterick 1985; Wheeler and Abdullah 1988). Some researchers have found that food is distributed inequitably within households and that certain household members (often adult males) may be favored over others when food resources are low (Carloni 1981; Chen et al. 1981; Schofield 1974). Other studies have challenged the view that child malnutrition is related to age-based food allocation practices. They have found that children are not necessarily deprived of food when other household

members have adequate intake (Brahmam et al. 1988; Leonard 1989b; Lipton 1987; Okeke and Nnanyelugo 1989; Wheeler and Abdullah 1988). In fact, some of these researchers have found that children are protected rather than discriminated against when food supplies are low (Leonard 1989b; Wheeler and Abdullah 1988).

Food allocation often is thought to be guided by "rules" or prescriptive norms that vary from culture to culture (cf. Van Esterick 1985). In regard to children, a variety of cultural beliefs and behaviors are encompassed into a broad category called child care and feeding practices and many have been interpreted as having an indirect effect on child malnutrition and poor health (Cassidy 1980; Scrimshaw 1978). For example, weaning practices that prohibit or restrict the consumption of certain foods, especially animal protein, food competition based on sex and age, and maternal rejection have been characterized as a form of neglect or underinvestment in children (ibid.). The authors note that these practices are not consciously intended to harm or to deprive children relative to others but are socially sanctioned customs believed to protect or improve children's health (ibid.).

Some child feeding practices are interpreted as survival mechanisms. Lepowsky found in New Guinea that food taboos in early childhood confer indirect protection against potentially lethal diseases such as malaria and diarrhea (1987). Cassidy suggests that mothers may permit children

to experience hunger, where hunger is fact of life, as part of the child's socialization in preparation for later hardships (Cassidy 1980:127). Again, the authors themselves contextualize these practices as culturally appropriate and point out that while food restrictions practices and images of parental "neglect" appear detrimental to the outside observer, they are seen by the actors as beneficial to health.

The portrayal of certain child care practices as neglectful, even where parental intentions are benign, has been taken to imply that "traditional" culture or individual care givers, usually women, are partially responsible for malnutrition in less developed countries. The view that certain non-Western cultural beliefs and practices are detrimental to child health lies at the base of many international health promotion programs. These programs tend to view poor child health as the product of parents who follow irrational, dangerous, or erroneous ideas about child care. Programs seek to replace these "traditional" ways with proper or "modern" techniques and to teach mothers the "correct" ways of caring for children. In this view, child care practices are seen as disarticulated "objects" or independent "pieces" of information that can be removed and replaced with "better" practices or knowledge.

This approach to health intervention draws attention away from the larger factors at work--crushing poverty and an economic structure in which people are not a high

priority--and instead puts the focus of blame on "traditional" ideas (i.e., culture) or the individuals who subscribe to them. This view of culture as particularistic, static, and potentially harmful is characteristic of the modernization perspective of development (Valenzuela and Valenzuela 1981). Proponents see poverty linked to tradition and ignorance, and the path out of poverty as a process of linear evolution from tradition to modern. Critics of this perspective, who take a dependency or world system approach, view poverty as a result of capitalist expansion and the historically constituted structure of unequal economic relations between the developed and less developed nations (ibid.). In this view then, poverty and its concomitant problems of malnutrition and poor health are not situated within the realm of culture but a society's position within the larger economic and political structure.

Related issues of selective neglect and maternal detachment and withdrawal have been the topic of a recent debate on child mortality in an urban setting in Brazil (Nations and Rebhun 1988; Scheper-Hughes 1984, 1987b, 1988). Although the participants differ in their views of child neglect and maternal sentiment, they agree that extreme poverty, not culture, is the underlying cause of high rates of child death. These studies show that cultural practices and beliefs are constrained by a larger economic structure that leaves some people to live under conditions of

inadequate medical care and housing, contaminated water, and food deficiencies (ibid.; Van Esterick 1989).

Research on child care and household food allocation raises questions about how we perceive households and children's place within them. Recent studies have reexamined the issue of household economy and criticized conventional economic depictions of households as cooperative, harmonious units (Folbre 1988; Rogers and Schlossman 1990a; Dwyer and Bruce 1988; Wilk 1989). The production and consumption of resources, be they food, income, labor, or time, are now seen to be governed by rules that "are the result of conflict and conflict resolution based on different members' power and influence within the household" (Rogers and Schlossman 1990b:23). In this model of households, it might be expected that children would have little influence in resource allocation. As non-producers, children do not figure greatly in the economic or political hierarchy of a household. Young children especially are under parental care and thus their interests are under the control of others, usually women who themselves may be subordinate to adult males. As much as this research has greatly expanded our understanding of households as productive units, it has not clearly addressed the role of children in household distribution.

Conventional economic models, neoclassical and Marxian, have "diametrically opposed theories of the firm, but remarkably similar theories of the household" (Folbre

1988:248). Both models overlook potential conflict among its members and tend to portray the household as a unified harmony of interests. In both perspectives, children are viewed in terms of their productive potential and assigned a peripheral status, if any. Although households are considered cooperative it does not necessarily mean that individual members are treated equally. Household hierarchies based on social categories or resource control are expected to predict how resources, such as food, are distributed within the household unit. Thus, as with the revisionist view of households, it might be expected that "lower status" and "non-productive" children would tend to suffer when food resources are tight.

Demographers and anthropologists have examined the economic roles of children in a number of societies, including rural Andean society (Nag et al. 1978; Stinson 1980a; Tienda 1979; Tucker 1986). While these studies have pointed out that children play a economic role in households, they focus on household production, and therefore, justify why people bear and feed children in terms of economic utility. My research on children, diet, and hunger raises other questions about household distribution that go beyond a strictly economic or productive definition. I agree with Thorne that social theory is "deeply adult-centered" and that an examination of children allows us to question some of the assumptions we hold about household economics (1987:85).

Summary

In this research analysis I seek to go beyond a simple study of child nutrition in the Andes and to understand the issue of child nutrition within the context of seasonality, culture of child rearing, and household economics in highland Peru. I view seasonal variation in the agricultural and labor cycles as structuring the household diet and food supplies. Seasonal hunger is the result not only of ecologically-based factors, but also of economic factors. Children's diets, however, are further structured by cultural perceptions of their needs and the ways they should and can be fed. As highlighted in the ethnographic analysis of the hunger season, we see how hunger is produced and experienced when ecological and economic factors clash with cultural norms of adequate care.

CHAPTER TWO

BACKGROUND: THE SETTING, METHODS, AND SAMPLE

This chapter is divided into three sections; the first provides background information on the research site, Ura Ayllu; the second describes the methods I used to gather the quantitative and qualitative data; and the final section describes the sample from which the data are drawn. Brief ethnographic descriptions of each of the fifteen households who participated in the study are included at the end of the chapter. These focus household composition and economic strategies.

The Setting

The Community

Ura Ayllu is an indigenous community of Quechua-speaking peasants who make their living through a combination of subsistence agriculture, petty commodity production, and wage labor.[1] Located in Sandia Province (Department of Puno) in southern Peru, Ura Ayllu is one of

[1] I use the term subsistence agriculture to mean agricultural production is used for consumption not sale.

the comunidades campesinas[2] of the Cuyo Cuyo District (Figure 2.1).

Ura Ayllu is composed of two discontinuous settlements: the main residential center which goes by the same name and a "daughter community" or anexo, Aripo, located about twelve kilometers, by road, down the valley. Although legally recognized as one community, the two sectors are in many ways independent from the other. Each unit has its own set of political authorities and conducts its own census; each unit also independently coordinates agricultural activities and crop rotation.[3] My research was conducted primarily within the main residential center and thus my observations are specific to that unit. Unless otherwise noted, I will use the term Ura Ayllu to designate the main center and Aripo when referring to the other settlement.

Census figures[4], shown in Table 2.1, indicate the population for each of the settlements in 1985. Ura Ayllu is by far the larger sector, with the majority of people (82

[2] Comunidades campesinas (peasant communities) are corporate landholding communities officially recognized by the Peruvian government. This designation is assigned after the community presents its claim, including proof of its territorial boundaries and long-standing occupation of the territory) to the government and is registered with the Bureau of Peasant Communities. Prior to the 1969 agrarian reform, legally-recognized native communities were referred to as comunidades indígenas.

[3] Despite the social and economic ties that link the two settlements, I believe their differences warrant separate consideration.

[4] The community census follows a format set forth by the Bureau of Peasant Communities (Recharte 1990). While the census should include all people living in the community, a few residents who were absent during registration were omitted.

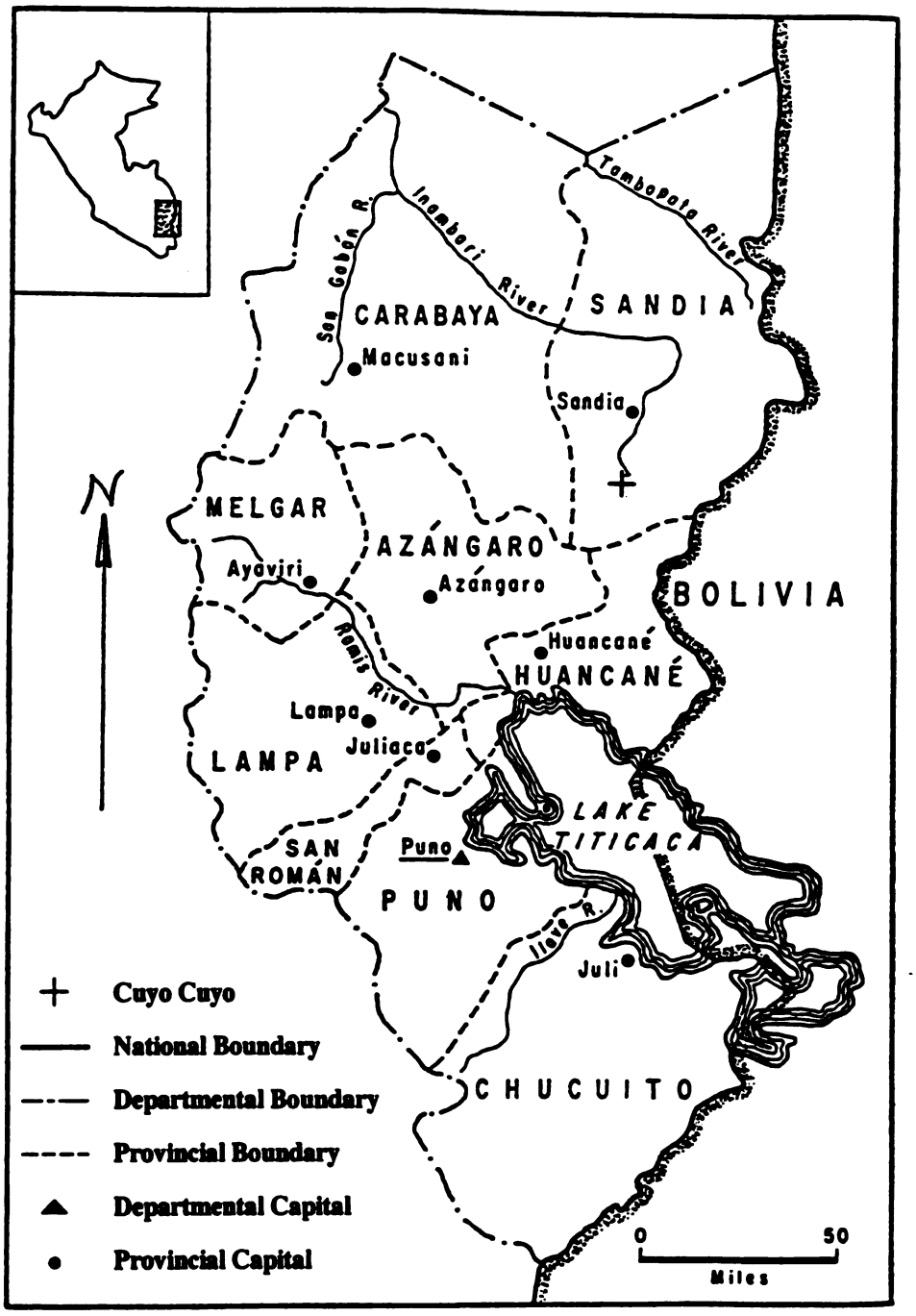

Figure 2.1

Provinces in the Department of Puno

Table 2.1

Ura Ayllu Population

	Ura Ayllu[a]		Aripo		Total	
	N	%	N	%	N	%
Households with children[b]	122	72.6	24	49.0	146	67.3
Households without children	43	25.6	25	51.0	68	31.3
Missing data[c]	3	1.8	0	0.0	3	1.4
Total households	168	100.0	49	100.0	217	100.0
Male Adult	127	18.0	42	28.0	169	19.7
Female Adult	145	20.5	37	24.7	182	21.3
Male Child	231	32.7	29	19.3	260	30.4
Female Child	203	28.8	42	28.0	245	28.6
Total Population	706	100.0	150	100.0	856	100.0

Source: Padrón Comunal Ura Ayllu 1985; Padrón Comunal Anexo Aripo 1983.

[a] This column refers to the main residential community.

[b] Children are defined in census as dependents, that is, children of all ages who reside in the house of an adult comunero. Ages of dependents are not provided in the census. Adults are individuals over age 18 who are registered in the roster.

[c] These households are listed in the census but no information on dependents was indicated.

percent) living there. Ura Ayllu and Aripo have a combined population of 856 people (706 and 150 residents respectively), close to 60 percent of whom are dependent children less than 18 years of age. The population is divided into 217 households, 67 percent of which have children. According to the census figures, average household size is 4.2 people for Ura Ayllu and 3.9 people for both sectors combined.

Household Composition

Households are the basic social and productive unit in Ura Ayllu. Households are based on the nuclear family--a married couple and their children.[5] The system of kinship is bilateral, a pattern oberserved throughout the Andes (Lambert 1977). In the Andes, there is an emphasis on sibling seniority and virilocal post-marital residence (Recharte 1990; Lambert 1977), features seen in Ura Ayllu as well. Siblings older and younger than ego are addressed with titles that denote relative age (kurah is used for an older sibling and sullka for a younger sibling). The youngest sibling (the chanaku) is expected to live with and take care of his or her parents until their death and to receive perferential inheritance of the natal house.

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[5] An elderly widowed parent may also reside with the family. Most elderly people, however, retain their own household as long as they are able. Grandchildren are often sent to spend the night with and help a grandparent with agricultural and domestic chores.

The social and economic success of a household is dependent upon kinship relations with parents, siblings, and affines. Ritual or fictive kinship ties (compadrazgo) are also crucial to the viability of the household unit. When a man and woman decide to marry, the prospective bride moves into the man's natal household, where they live for several years as convivientes (unmarried couples). During the period of virilocal residence, the couple begins to accumulate resources necessary for a marriage ceremony and for building their own home. This period of pre-marital co-residence is called "trial marriage" or sirvinakuy in many areas of the Andes (see Isbell 1978; Carter 1977).

Formal marriage takes place after the parents of the bride and groom find two married couples willing to become godparents (compadres) for the new marriage.[6] Wedding godparents are vitally important to the newlyweds not only because they assume a large part of the wedding costs but because they are instrumental in getting the new household established and mediating domestic conflict throughout the couple's life. Couples are married first in a civil ceremony at the municipality in Llaqta Ayllu. Some time later they will be married in a religious ceremony.

Thus, the developmental cycle of the household begins once a married couple has acquired sufficient finances to

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[6] The two sets of wedding godparents are called hatun padrino ("big godparent" and huchuy or aras padrino ("altar godparent"). Hatun padrinos have more authority over their godchildren than do huchuy padrinos.

purchase land and build a house. It is at this point that the couple and their children leave the husband's natal home and establish a separate household.[7] Men and women each inherit lands from both of their parents. The lands brought into the marriage by a husband and wife are not pooled but are kept as separate properties. Thus, when the time comes for children to inherit land, each child receives plots from both the mother and father.

Parents claim that land is divided equally between all children regardless of sex or age. Recharte found, however, that this ideal is rarely achieved in practice in Ura Ayllu (1990). He states that "the children who receive the best parts seem to be those who have won, for whatever reasons and by whatever means, the loyalty of their father and/or mother" (ibid.:74). These attempts to win parental favor may create conflict among siblings. Thus, the flexibility of inheritance allows parents to exert control over their children long after they have left the natal household.

An individual's first sets of godparents are acquired early in childhood. Shortly after birth, the parents of the newborn ask a couple to be baptisimal compadres or unuchasqa padrinos. This baptism is performed in the home, using salt and water. The ritual is rather informal and generally no gifts are presented to the child. Parents also may ask the godparents to assist them in determining a name for the

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[7] Married couples usually leave the husband's natal home after the birth of one or two children.

child. Some time later, a child may be baptized in the Catholic Church, and parents may ask the same or a different couple to be the godparents (bautisachisqa padrinos) for the religious rite.[8] Gifts are given to the child after this ceremony.

The next set of godparents, rutuchisqa padrinos, are obtained for a child's first haircut which takes place when the child is about two years old. The haircutting ceremony takes place at home and is a joyful celebration shared with friends and relatives of the parents and godparents. A child's hair is quite matted, knotted, and snarled by this age. The padrinos make the first cuts and take obvious delight in finding the densest knots and cutting them off with shears. The scissors are then passed to the rest of the party and each person cuts off a piece until the child's head is nearly bare. The swatches of hair are put into a bowl, sprinkled with wine, and saved. After the cutting is over, a meal, usually with qowi (guinea pigs), is served to the godparents and guests. After eating, the guests and family spend hours sitting in the patio celebrating the child's rite of passage. Gifts are given to the child by the rutuchisqa padrinos. The preferred gift is a female sheep which becomes the property of the child; any offspring produced by the sheep also belong to the child.

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[8] There is no resident priest in Cuyo Cuyo. Baptisms are performed by itinerant priests for groups at different times of the year.

An early Spanish account by chronicler Garcilaso de la Vega mentions the hair-cutting ritual (Garcilaso de la Vega [1609] 1966). It is interesting to note that his description closely resembles that observed today, including the prestation of animals and clothes. According to Garcilaso de la Vega the hair cutting ceremony is associated with naming and takes place at the time of weaning (at the age of 2 years or more). Although Ura Aylliños did not mention a connection between the timing of weaning and the timing of the haircutting ceremony, the two events roughly coincide. Thus, the hair cutting ceremony may symbolize at various levels a child's departure from infancy and entrance into personhood.

Ethnicity

People in Ura Ayllu are descendents of ethnic groups both indigenous to and from outside the valley. Recharte states that the Cuyo Cuyos were identified as an indigenous ethnic group in the census of 1614 (1990:26). Ethnic inter-mixing with "foreign" groups grew dramatically from the late 16th through the early 18th centuries (ibid. 28). It appears that many of these immigrants were Indians escaping corvee labor in the silver mines in Potosí in modern Bolivia (ibid.). The valley of Sandia experienced another wave of immigration many years later, in the late 19th century, when peasants from Azangaro province moved to the valley as a

result of hacienda expansion and recurrent droughts in the puna (ibid. 46).

Today, residents of Ura Ayllu refer to themselves as Ura Aylliños (people from Ura Ayllu) or comuneros (members of a comunidad campesina). They distinguish themselves from "others" along many lines but one of the most prominent oppositions is that between campesino (peasant) or comunero and mestizo.[9] As social categories, mestizos (mistis in Cuyo Cuyo) and comuneros are differentiated by language, dress, education, and economic strategies. For example, mestizos are said to represent the dominant culture and class; they are "white" Spanish speakers who have greater wealth and status as a result of their fuller participation in the national economy. In contrast, comuneros are described as non-Spanish speakers of Indian descent who adhere to "traditional" values and earn their living through agriculture. As a result of misti domination of the Sandia valley in the past, people continue to make the contrast between themselves and mistis, although the differences between the two groups are much less marked today.[10]

Quechua is the lingua franca among Ura Aylliños. Generally, older men, most adult women, and young children

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[9] Mestizo has been defined as a person of mixed European and Indian ancestry. Despite the biological connotation of the terminology, the distinction between Mestizo and Indian is a product of social, economic, and political history.

[10] Misti domination of the local population was at its strongest during the latter half of the 19th century and the first decades of the twentieth. Most mistis were merchants, landowners, judges, or political representatives of the Peruvian state (Recharte 1990).

are monolingual Quechua speakers. Spanish, in contrast, is the language of education, government, business, and travel; it is more commonly spoken by adolescent and adult men. Adult woman have fewer years of education,[11] and do not hold political offices or travel much outside the region. Women, thus, have less exposure to, or need to master Spanish than do men. Many women, especially those under the age of 40 who attended school for at least a short period, are able to understand some Spanish although most are very reluctant to speak it.

Clothing styles reflect the male-female contrast seen in language. Ura Ayllu women wear two different styles of clothing: 1) "typical" Cuyo Cuyo dress,[12] and 2) chola dress.[13] Typical Cuyo Cuyo dress is worn exclusively by adult-age women. This kind of dress consists of ankle-length, wrap-around skirts (p'istu) made of home-woven woolen fabrics called bayeta (Sp.; Eng., baize). The coarse fabric is dyed brilliant shades of red, orange, and pink or left in its neutral off-white color. Skirts are held in place with belts (chumpis) woven by the woman. For daily

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[11] Census figures indicate that Ura Ayllu women average one year of schooling (N=167) to men's 3.9 years (N=142).

[12] This is a style of clothing worn by women throughout the Cuyo Cuyo district although some elements are neither "typical" nor "traditional" (see below).

[13] Chola (and the masculine form cholo) has been defined as a "derogatory term for [the] supposed intermediate status between Indian and mestizo" (Sallnow 1987:309). Identification of this status is marked most visibly by clothing. Chola and its diminutive form cholita are used locally, in an affectionate, non-derogatory manner, to refer to young girls, usually of toddler age. I never heard the masculine form used with boys.

use, women wear three layers of skirts; many more layers are used for ritual wear.[14] The skirts are complemented with layers of machine-made synthetic sweaters. Brightly colored and intricately hand-woven shawls (lliqllas) are worn around the shoulders and held in place with large safety pins. Women's heads are covered with green or blue machine-woven cloth (chuku) that covers the head and drapes down over the shoulders and back. The chuku is held in place with a small black hat (montera), the brim of which may be decorated with flowers, both live and plastic. Women either wear plastic sandals or go without shoes.

In contrast to Cuyo Cuyo dress, all chola dress is purchased. In Puno, chola dress consists of a full, knee-length skirt (pollera), machine-woven shawl and sweaters, and bowler hat. Some adult women wear this style of clothing on a daily basis while others only wear it occasionally. Young, single woman may wear the full pollera-style skirt or narrower skirts made of synthetic materials. When travelling outside the region, most women wear chola dress to avoid discimination and being robbed. Cuyo Cuyo dress identifies a woman as a rural resident and may make her appear more susceptible to thieves.

Men's clothing is much less colorful and consists of purchased pants, shirts, sweaters, jackets, stocking cap (ch'ullu) and sandals made from tires (ojotas). Like the

[14] I was dressed in typical clothing on several occasions. On one occasion I weighed the clothing (six skirts, lliqlla, sweaters, chuku); total weight was 7.5 kilos or 16.5 pounds.

sweaters, sandals, and chola-style clothing worn by women, all these items are mass-produced and of inferior quality; they are readily available at urban and rural markets throughout the sierra. The only hand-woven wool that men wear regularly is a poncho and every man owns one.

This brief discussion of language and dress in Ura Ayllu, reveals a blending of the markers used to distinguish ethnic status. Like the women who change their clothes and, therefore, "status" when they leave the community, ethnic distinctions in Ura Ayllu are flexible and changing.

Ecology

This section examines the ecological setting of Ura Ayllu. After a brief review of the climate, I describe the research site within its regional context. The following section hightlights a key feature of Andean subsistence strategies--vertically diversified agricultural production. This particular subsistence pattern is a characteristic and long-standing feature of Andean societies (see Murra 1984; Brush 1977).

Climate

The climate in Ura Ayllu is generally cool, cloudy, and humid. During 1986, average daily temperatures ranged between 38.3 and 59.3 degrees Farenheit; the average mean temperature was 48.8 degrees. Average rainfall during 1986 was 998.3 millimeters or 39.9 inches.[15] Late afternoon fogs

[15] Data source is PSE Weather Survey 1985-1988.

are common and may occur at any time of the year. Warm moist air from the tropical montaña travels up the valley and condenses when it meets the cooler temperatures in the higher altitudes. The dense fog typically rolls into the valley around four o'clock in the afternoon and then lifts shortly before dark at about six p.m.

The year is divided into two distinct seasons, wet and dry. The rainy season begins in November, peaks during December and January, and ends in April. The months of May through October represent the dry season although rains may occur during these months, especially in September and October. During the driest months of the year--June through August--days are sunny and warm and the nights are clear and cold, often below freezing. The panorama changes dramatically over the course of the year, turning from arid brown in June and July to lush green in December and January.

Regional Context

The community of Ura Ayllu is located in the province of Sandia, in the Quechua-speaking region of the department of Puno north of Lake Titicaca (see Figure 2.1 above). During the colonial period, Sandia was part of its neighboring province Carabaya, an area known for its gold deposits and mining operations. Independent provinces since 1875, Sandia and Carabaya form the northern boundary of Puno Department and encompass within their borders a wide range

of ecological zones from high plateau (puna) and snowcapped mountain ranges to the tropical foothills of the Amazon basin (Figure 2.2). Ura Ayllu, one of the four communities in Cuyo Cuyo District, is located in the tuber-producing region of Puno's eastern escarpment.

The Pampa de Ananea, the plateau that forms the high-altitude region of Sandia Province, is located above Cuyo Cuyo and to the south, with an altitude of 4,500 to 4,600 meters above sea level (Figure 2.3). Bordered by the snow-capped ranges of Carabaya and Apolobamba, the plateau is a tundra-like area used for camelid (llama and alpaca) and sheep herding. The herders exchange their animal products (meat, cheese, and wool) for agricultural resources produced by the farmers in the valley below.

The communal gold mines of Ancocala are located on the windy plateau, southeast of Lake Saracucho (Figure 2.4). These placer mines are part of the territory belonging to Puna Ayllu, Ura Ayllu's neighboring community in the Cuyo Cuyo district. The Ancocala mines are worked exclusively by Puna Aylliños during the rainy months between November and March.

The district of Cuyo Cuyo lies in a narrow valley below the Ananea plateau (Figure 2.5). The district is composed of four communities--Cojene-Rotojoni, Puna Ayllu, Ura Ayllu and Llaqta Ayllu.[16] The first three are legally-recognized

[16] For the purposes of this study I use Cuyo Cuyo to refer to the district and Llaqta Ayllu or el Pueblo to identify the town.

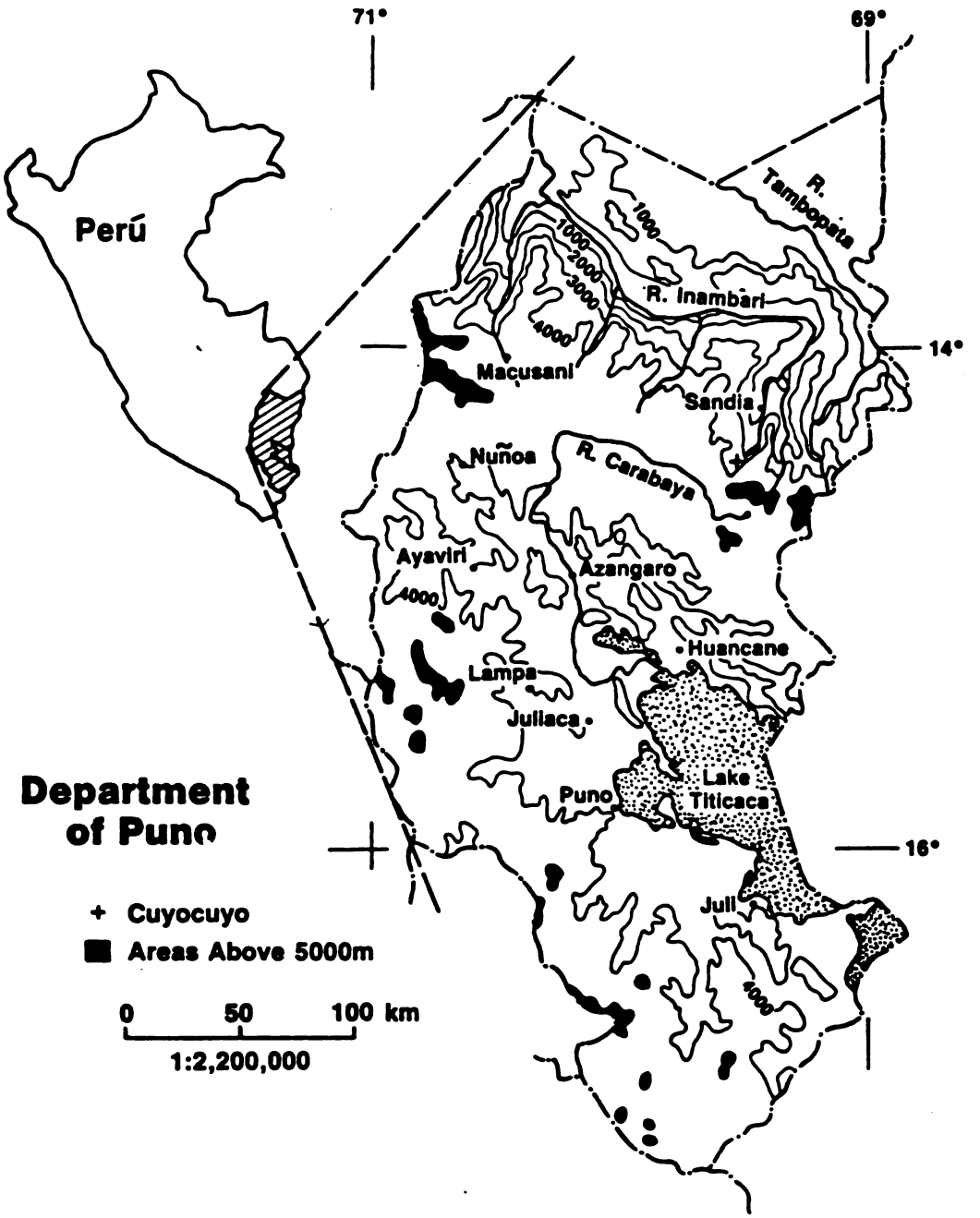

Figure 2.2

Department of Puno

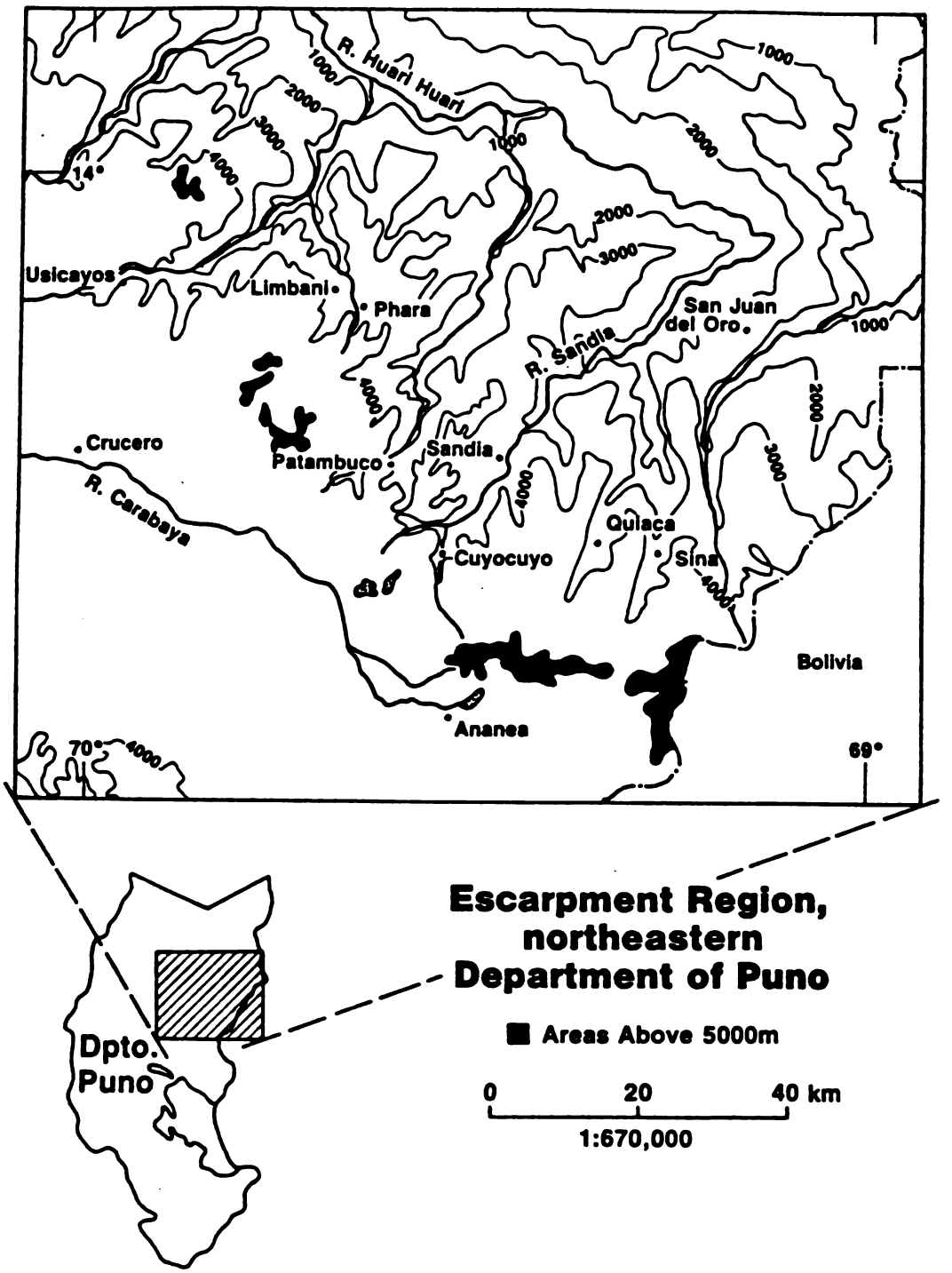

Figure 2.3

Escarpment Region, Northeastern Department of Puno

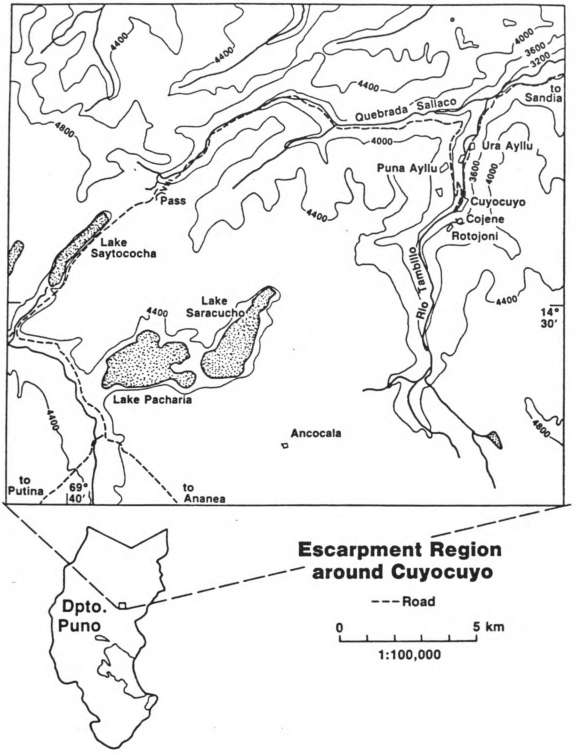

Figure 2.4

Escarpment Region Around Cuyo Cuyo

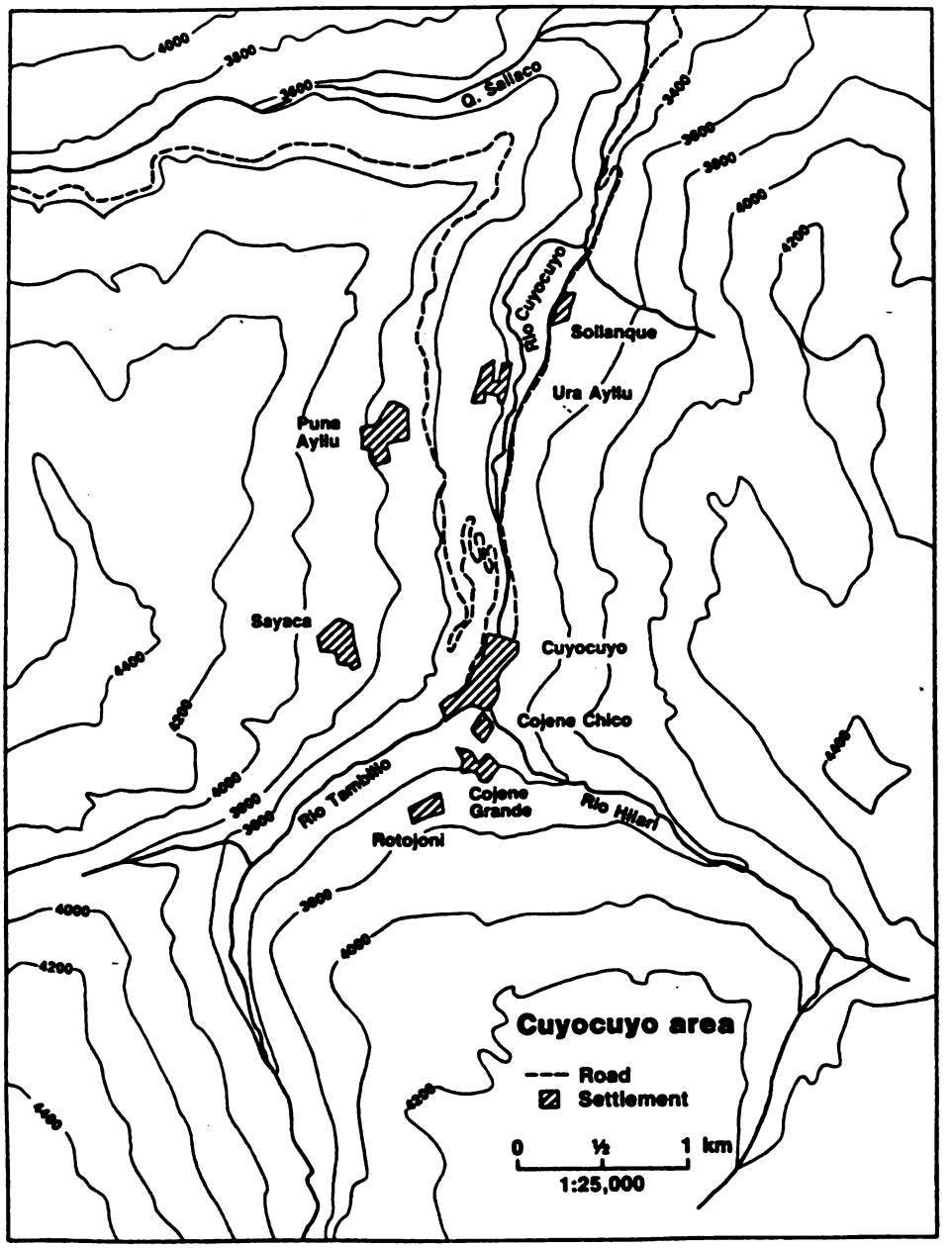

Figure 2.5

Cuyo Cuyo Area

peasant communities (comunidades campesinas). Llaqta Ayllu, the capital of Cuyo Cuyo district, does not hold this legal status, although it receives state funds and recognition by virtue of its status as district capital. Llaqta Ayllu is the seat of district-level government and services, including the municipality, police post (Guardia Civil), justice of the peace, rural health post, and high school.

Llaqta Ayllu lies at the convergence of two rivers, the Tambillo and Hilari, that flow into the canyon from the Ananea pampa (see Figure 2.5 above). These rivers receive much of the snow run-off from the high peaks surrounding the valley and their flows may become torrential during the height of the rainy season. In January 1984, a major landslide destroyed part of Llaqta Ayllu when the Hilari overflowed its banks.[17] The shells of homes and the parish church remain until today but residents are beginning to rebuild their homes away from the disaster area. The landslide also destroyed the local hydroelectric plant, leaving the town without electricity. None of the other communities in the district have, or ever had, electricity.

The Cuyo Cuyo quebrada (steep valley) is narrow and the mountains that form the valley walls rise precipitously from the river. These valley walls are covered with tiers of stone-faced terraces (andenes) that serve, in part, to increase the area of arable land. The valley is rocky and

[17] Several buildings located down river in Ura Ayllu also were destroyed when the mud-choked river overflowed its banks.

contains many outcroppings of slate used in the construction of terrace walls and buildings. With the exception of scattered stands of eucalyptus trees (used for lumber and cooking fuel) which lie along the river bottom or around houses, the mountain sides are treeless. Woody vegetation typically is found only where it is inaccessible to persons scavenging the countryside for cooking fuel. Small clumps of scrubby bushes and other small plants (e.g., mint and ferns) grow wild, dotting the intensively terraced slopes.

Ura Ayllu lies about two kilometers downstream from Llaqta Ayllu at an elevation of 3,400 meters above sea level.[18] Houses flank the road through the community and are clustered together in groups on either side of the river. Homes are built with shale and daub and roofed with either dried ichu grass which grows in the puna or sheets of corrugated tin (calamina). Most households have a water tap located in the patio, although flow is unreliable. Ura Ayllu has its own state-financed elementary school as well as a small Catholic church and a small Adventist hall used as a school and for religious services. A community meeting hall is located near the school, on the river plain.

The agricultural fields--surrounding the village on the river plain and the hillside terraces--are devoted primarily to tuber and broad bean production. This area of agricultural fields is referred to as the estancia. Ura

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[18] In Figure 2.5, Sollanque forms part of the main residential center of Ura Ayllu.

Ayllu's territory extends down valley, however, into the corn growing zone where its "daughter community," Aripo, is located (about 2,800 masl). Intensive corn cultivation on terraced slopes extends all the way to Sandia, the provincial capital.

Sandia lies approximately 30 kilometers (by road) down vally from Ura Ayllu. Sandia is the largest town in the province and is the home of provincial-level government offices. It is an active commercial center with two paved streets, many well-stocked stores, and a large food market. The only resident priest in the province resides in the parish there. Sandia also has the only hospital in the province, which is small and poorly-equipped. It is financed and operated by the Swiss government.

A few kilometers beyond Sandia, crop cultivation ends, giving way rather abruptly to dense tropical forest (at approximately 2,000 m.). It is in these forested foothills (yunka or montaña), in the area called Valle Grande, where peasants from the Cuyo Cuyo valley have their coca and coffee fields, as well as lands used for gold and incense extraction (Figure 2.6).[19] San Juan del Oro (see Figure 2.3) is located in the yunka and is a region that specializes in the production of tropical cash crops (e.g., citrus fruits, bananas, coffee, and coca) which are exported

[19] Only six (40 percent) of the households in this study own lands in this region. Of these six, only four households continue to cultivate the land. It appears that people are abandoning these fields for the more lucrative pursuit of gold outside the region.

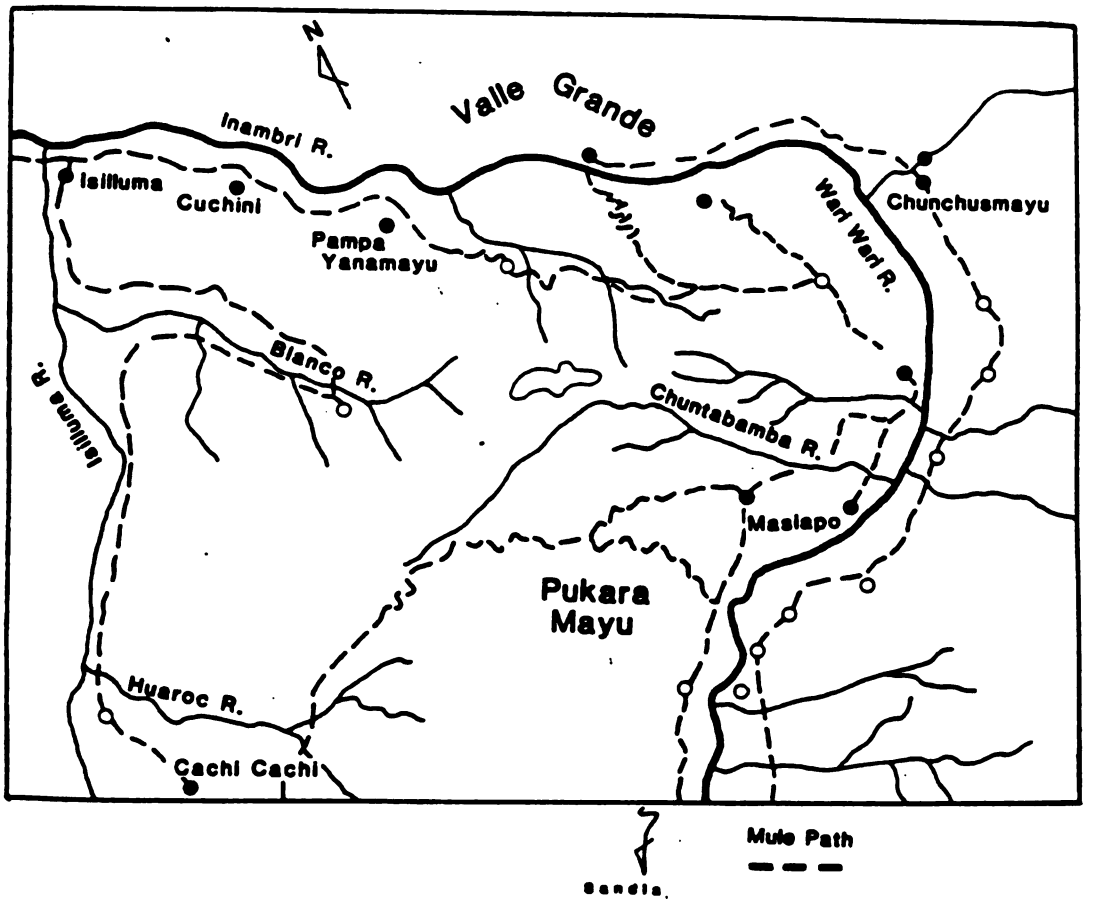

Figure 2.6

Montaña Region of the Sandia Valley
(Source: Recharte 1990:19)

to the cities of Juliaca, Puno, and Arequipa. The motor road that goes through Ura Ayllu links the fruit- and coffee-producing region of San Juan del Oro and the Tambopata valley to these highland urban markets. Originating in Juliaca, the road reached Cuyo Cuyo shortly after 1929 (Recharte 1990:50), Sandia in 1945 (Martínez 1961:110), and San Juan del Oro in 1965 (Dew 1969:104).

Production

Ura Ayllu peasants meet their subsistence needs through a mixed economy of agriculture, petty commodity production, and wage labor. As described in the previous section, agricultural production takes place mainly within the boundaries of the community, making use of the vertically diversified ecology.[20] In some cases, however, households own, rent, or sharecrop fields located outside the community. Ura Ayllu's landholdings cover an altitudinal range from about 2,800 to about 3,500 meters. In agricultural terms, they extend from the high altitude tuber-producing region to the lower elevation region dedicated to corn cultivation.

Agriculture is entirely dependent on rainfall. With the exception of some communal fields located in the village, all agricultural plots (chakras) are private property. Each household possesses or rents a number of scattered plots and keeps multiple complementary

[20] See Goland (1991) for a comprehensive investigation of agriculture in Ura Ayllu and Puna Ayllu.

agricultural calendars. That is, agricultural activities (e.g, planting, weeding, and harvesting) are staggered in time according to the crop and location of a field. There are, therefore, a number of "plantings" and "harvests" in Ura Ayllu. Table 2.2 shows the number of plots, by crop, planted by fifteen households in my sample in 1985 (harvest 1986). We see that a total of 258 fields were planted, that is, an average of 17.2 fields per household. Although the number of fields seems substantial, the total area planted is quite small. Data obtained from the PSE sample, for the 1985-86 agricultural year, indicate similar numbers of planted fields--average 18 plots per household--as the present study. The average land area planted per household is just under half a hectare (4,950 meters^2) (Goland 1991).

Most aricultural tasks are performed with short-handled hoes (rawk'ana) and foot-plows (wiri). Both kinds of tools are manufactured by the household with lumber from the montana, rawhide from the puna, and iron blades purchased in the market. The tools are lightweight thereby facilitating their transport to distant fields. A household usually has a number of rawk'anas so that household members may work simultaneously. Slightly smaller versions are made specifically for young children. The day our neighbor gave his four-year old son his first rawk'ana, a scaled-down version that would fit his small hand, was a significant event in the child's life. The child immediately dropped the stones he was playing with and began to hoe up the weeds

Table 2.2

Agricultural Fields Planted in Ura Ayllu in 1985
(N=15 households)

	Number of Plots per Household				
	Total	Potato[a]	Other Tubers[b]	Broad Beans[c]	Corn[d]
Average	17.2	5.3	5.3	3.8	2.9
Minimum	11	2	1	2	1
Maximum	29	12	9	7	8
Total	258	79	79	57	43

Source: Author's SES Questionnaire 1986

[a] Includes potatoes of long and short vegetative cycles (papa wata and papa chaucha).

[b] Includes oca (Oxalis tuberosa), illaco (Ullucus tuberosus), and izaño (Tropaeolum tuberosum) which may be inter-cropped with small portions of potatoes and broad beans.

[c] Includes broad beans (Vicia faba) and, in some cases, may include combinations of oca, illaco, izaño, and corn.

[d] Includes mostly corn but may be inter-cropped with broad beans, tubers (potatoes and other), yacón (Polymnia sonchifolia), and racacha (Arracacia xanthorrhiza).

growing between the stones in the patio. The child had taken an initial step toward becoming a productive member of the household.

The communities in the valley, including Ura Ayllu, use a system of sectorial rotation in their agricultural fields (Camino et al. 1981). This rotation system is called manda in Cuyo Cuyo (laymi or turno in other parts of the Andes). The timing of cultivation and fallow periods varies according to the placement of the field on the escarpment. Ura Ayllu's estancia fields follow a six-year rotation cycle: four years of planting followed by two years of fallow. During the first year of the rotation, plots are planted with potatoes (Papa Manda).[21] The second year is dedicated to oca (Hatun Tarpuy Manda), followed by a mixture of broad beans and illaco along with oca volunteers (Kuti Manda) in the third year. During the fourth year fields are planted with broad beans (Hawas Manda). The fifth and sixth years of the rotation are the years of fallow (Samay Manda).

A separate rotation cycle operates in the fields near Aripo (Aripo Manda). Aripo manda is also on a six-year rotation but fields are only planted for two years (the first year with potatoes, the second year with oca), followed by four years of fallow. The corn fields located below Aripo are cultivated intensively for several years and then allowed to rest when the owner determines it is time.

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[21] Additional details on these crops are provided below (Food Resources).

The other part of the production equation is wage labor and petty commodity production. Ura Aylliños have been working for money since at least colonial times when they began to pay taxes to the Spanish Crown (Recharte 1990:137). Today, people earn wages from a number of different sources including agricultural work within the community and in the montaña region of the valley. The most significant form of wage labor, however, is gold mining.[22] Although men are focusing their wage labor efforts on work outside the region, people, especially unmarried young women (ages 17 through 22), continue to work in the harvests of coca, coffee, and fruit in the montaña. The wages they earn are spent on personal items (e.g., clothes, radios, bicycles) and on basic household necessities.

Ura Aylliños earn money from several sources but none of them is as important as gold mining. According to Recharte, gold mining provides Cuyo Cuyeños seven times more money than the income from all other sources combined (1990:127). Every year, most adult men leave the community and travel by truck to the Department of Madre de Dios to their placer mines. Many of the migrants have squatter's rights to small plots on several of the small creeks in the vicinity of Masuko and Huaypetue (Figure 2.7). Migrants either work alone, form business associations with

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[22] See Recharte (1990) for a detailed analysis of gold mining in Cuyo Cuyo. See also Bertholet (1986).

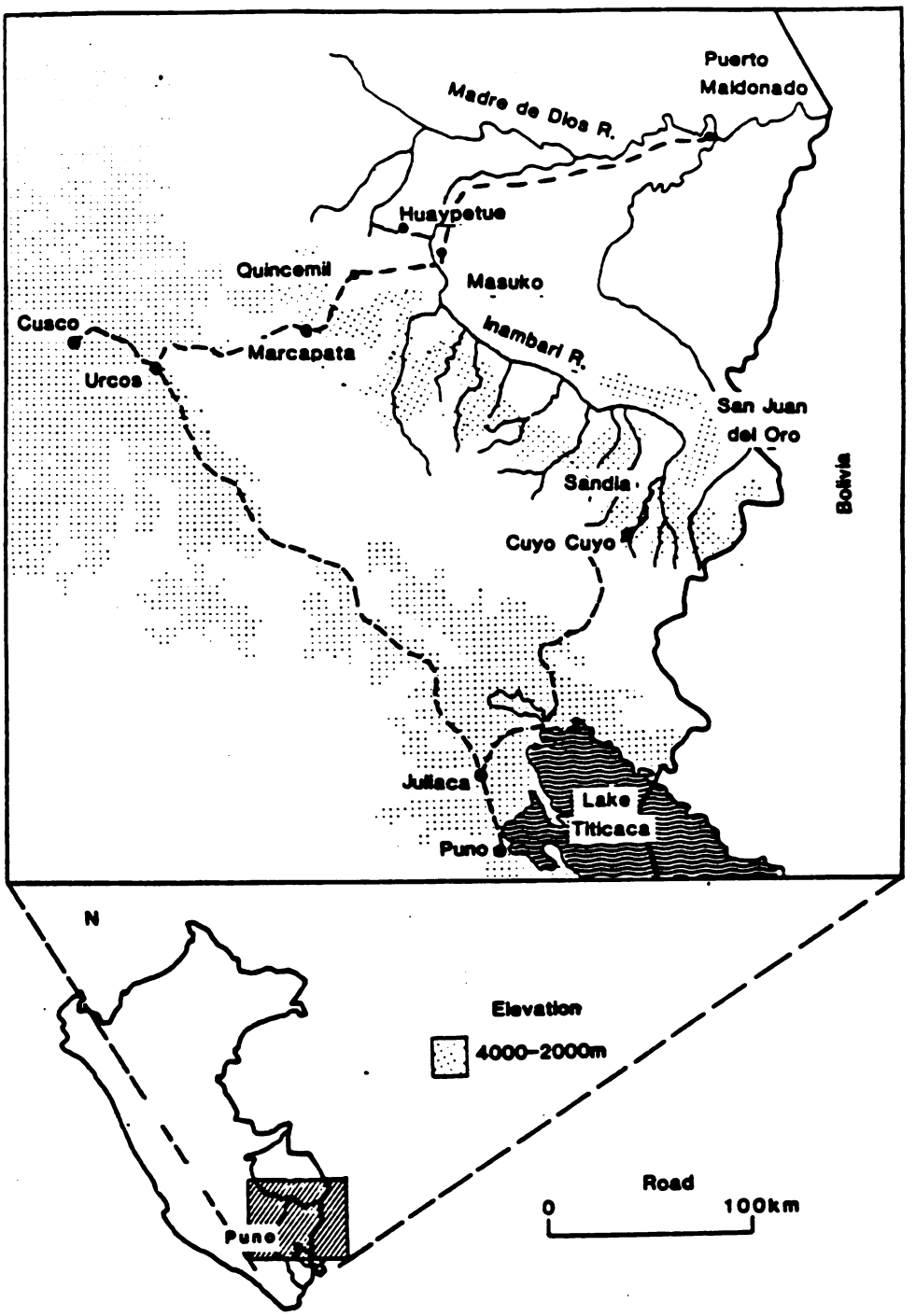

Figure 2.7

Main Migration Areas of Cuyo Cuyo Peasants
(Source: Recharte 1990:18)

relatives, work with locally-hired wage laborers, or utilize a combination of these types of labor relations.

Before the "gold rush" to Madre de Dios reached current levels in the late 1970s, most Ura Aylliños mined for gold in the montaña region in Sandia.[23] Migration to the goldfields in Sandia took place during the dry months, between the harvest and planting, and lasted for only several weeks at a time. Gold mining today is quite different. Migration is timed with the rainy season, taking men and adolescent boys out of the community soon after planting has ended. Due to the distance of the goldfields, migrants do not return for several months, usually during the harvests in April. One of the consequences of the current migration cycle is that agricultural responsibilities are falling increasingly on the women and children who remain behind.[24]

In sum, Ura Aylliños make their livelihood through a combination of agriculture and wage labor; and both are crucial to household survival. In the following section, I describe the annual cycle of productive activities in Ura Ayllu.

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[23] Recharte (1990:142) states that the Indians of Cuyo Cuyo have been mining gold without interruption since at least the mid-19th century.

[24] The feminization of farming is a trend seen throughout the rural Third World including Latin America (Deere and León de Leal 1982; Flora and Santos 1985).

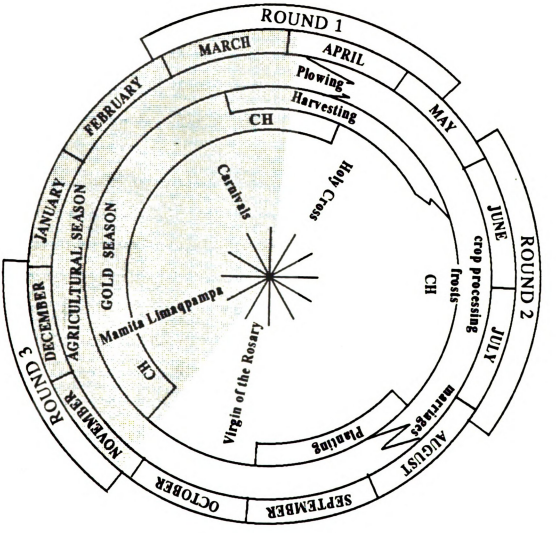
Annual Cycle of Production

Figure 2.8 shows the annual cycle of production, religious festivals, and climate in Ura Ayllu. Because my research on diet is structured along the annual agricultural cycle, I will describe briefly the activities of Ura Aylliños over the course of the year. The scheduling of the dietary surveys is indicated on the outer ring of the circle in Figure 2.8.

I will begin the description of the annual cycle with the planting of annual crops. Planting begins in August and ends in September or early October, prior to the Virgin of the Rosary (Rosario) festival. The first fields planted are the potato fields located on the riverplain, where drainage is poor. Plants in these fields are more susceptible to rotting and, therefore, are planted and harvested first (Goland 1991). Planting continues on the terraced slopes with broad beans, followed by oca, potato, and corn in September.

In addition to the planting of annual crops, Ura Aylliños make supplemental plantings of early-maturing varieties of potatoes called chaucha.[25] These supplemental crops of early-maturing (and early-harvest) potatoes are referred to as papa milli. Papa milli crops are important not so much for the quantity of harvest but for the timing of it. The first papa milli crop, planted in July and ready for harvest in December and early January, is particularly

[25] These supplemental plantings are not indicated on Figure 2.8.



Rain Period

CH Coca Harvest

Figure 2.8

Annual Cycle of Production in Ura Ayllu
(Adapted from Recharte 1990:122)

important because the harvest falls in the midst of the hungry season (see Chapter 4 for details on the harvest of these potatoes). A second planting of papa milli (called papa pang'o) may take place in February or March. This crop is harvested in late May and early June, several months after the harvest of the annually-cropped potatoes. Most of the households in this study had at least one field planted with papa milli.

With the exception of the milli fields, all annual crops are planted in August and September. Planting is followed by the Rosario festival, the largest and most expensive celebration of the year. Rosario is a week-long fiesta that begins in a small chapel in Sayaca (the daughter community of Puna Ayllu). A statue of the Virgin is carried down the slopes in a long procession and taken to Llaqta Ayllu where it remains for the week. During the first few days, Ura Aylliños gather in the town to celebrate with people from other communities in the district. Later in the week, Ura Aylliños return to their community and continue the elaborate celebration there.

Recharte sees Rosario as assuming the role of the fiesta of the "Maldonado miner" (Recharte 1990:182). Expenditures are great and are only possible for those who earn a substantial gold income. There are two sets of festival sponsors (alferados) who are responsible for

organizing and providing a conspicuous display of costumes, musical bands, food, and beer.[26]

The elaborate display of wealth during Rosario preceeds men's annual journey to Madre de Dios by only a few weeks. Most men begin emigrating when the rain begins in November. By the end of December,[27] the population of the community has shrunk to elderly men, women, and children, all of whom care for the agricultural fields and animals. This is the "hungry season" and is discussed in much more detail in Chapter 4.

The rains begin to decrease in intensity in late February and early March. The festival of Carnival (a moveable feast day) occurs at this time. Compared to Rosario, this celebration is smaller and less elaborate, due mostly to the absence of a significant number of community members. It is at this point when the potatoes growing in the riverplain are harvested. The terraced fields are harvested next, followed by oca and broad beans, and corn. Corn may be harvested as late as June. Fields are plowed and prepared for the next planting while the ground is still moist.

Most migrants to the mining camps in Madre de Dios do not return to the community until April, well after the

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[26] The dollar value of beer consumed in Cuyo Cuyo district in 1985 is $27,715 (Recharte 1990:240).

[27] The festival of Mamita Limaqpampa (indicated on Figure 2.8) is not celebrated by Ura Aylliños. This fiesta takes place in the puna lands of Puna Ayllu, near the mines of Ancocala.

harvests have begun. Men assist in the remaining harvests and plowing. The rhythm of life during the dry season is markedly different than that of the wet months of December and January. The dry season is a time of great activity: harvested crops are stored, tubers are processed, cooking fuels collected, and new houses built. In August people start to plant and the annual cycle begins anew.

Diet

I conclude the community description with an examination of the Ura Ayllu diet. This section sets the stage for later chapters by describing the kinds of food eaten and the structure of meals and food consumption.

Food Resources

Local foods

The foods grown by households play a dominant role in the Ura Ayllu diet (see Chapter 3). There are three different classes of foods grown for home consumption--tubers, grains, and pulses. Tubers are by far the most important food crop and constitute the main staple of the diet for much of the year.

There are several species and dozens of varieties of potatoes (Solanum tuberosum) grown in Ura Ayllu. Potatoes come in a wide variety of shapes and colors; each variety has its own name and culinary uses. Most of the potatoes grown in Ura Ayllu are those of long vegetative cycle (about

200 days). These are called wata papa (annual potato) and are distinguished from the early maturing potatoes or papa chaucha. Most households cultivate both kinds of potatoes.

Potatoes are consumed in both their fresh and dehydrated forms. People set aside the smallest potatoes during the harvest for later processing.[28] During the cold nights in June and July, these small potatoes are taken out of storage and put outside on beds of straw to freeze. During the day, after the sun has thawed the tubers, people walk carefully on them to press out the water. This cycle of freezing, thawing, and crushing continues for about a week, until the potatoes are completely dry and hard. Potatoes processed in this way are called chuño and can be stored for years. People also enjoy eating partially processed potatoes which are called moraya and ganku in this area.

Oca (Oxalis tuberosa) is the second most important tuber grown in Ura Ayllu and, like potatoes, there are a number of varieties (Hodge 1951). Oca are cylindrical in shape with wrinkled skins of various colors. Freshly harvested oca are rather bitter due the oxalic acid content of the tuber. To sweeten them, people place the oca in the sunshine for a couple of days. The sunlight also intensifies the colors, turning pastels into brilliant shades of red, pink, orange, and yellow. When cooked, oca

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[28] See Werge (1979) for a description of potato processing in the central Peruvian Andes.

is rather sweet, with a taste similar to but less intense than a sweet potato.

Bitter varieties of oca are processed like potatoes into dehydrated forms called khaya. The processing of khaya is similar to that of chuño except that dehydration is preceeded by a prolonged soaking stage. Fresh oca are put into specially built stone enclosures along the river (hucuña) to soak in cold, slow running water for about three weeks. This process leaches out the bitter oxalates and produces a blistered, very pungent smelling tuber. When the soaking period is over, oca are removed from the somewhat stagnent water and go through the same kind of freeze-drying process described above.

There are two other kinds of tubers grown in Ura Ayllu, illaco (Ullucus tuberosa) and izaño (Tropaeolum tuberosum), but neither of them are as important as potato and oca are in the diet today. Illaco and izaño are cultivated in small quantities, usually in association with broad beans, oca, and corn, and eaten in their fresh forms. People recall when izaño was eaten more frequently and processed into dehydrated forms (llinli) like potatoes and oca are today.

Corn and broad beans are the remaining crops cultivated in Ura Ayllu. With the exception of small plots of corn around houses, corn is grown intensively (without a regular, community-organized fallow) in Ura Ayllu's lower-lying lands near Aripo. Broad beans (Vicia faba) are grown in the manda fields near the community. Fresh corn and beans are eaten

during the harvest but the majority of these crops are dried for later use. Dried corn and beans are toasted and eaten with tea before a meal or between meals. Corn is also ground and added to soup as a thickener.

In addition to the major agricultural crops, relish foods such as collards, onions, carrots, lettuce, and herbs are grown in enclosed gardens (canchones) within the housing compound.[29] Although eaten in small amounts, these foods and herbs are crucial meal ingredients. The herbs grown in the gardens are also used for medical reasons. Perhaps because of the association between herbs and curing, all garden foods may be referred to as hampi or medicine.

Finally, it is interesting to note that Ura Aylliños do not cultivate other important Andean crops such as quinoa (Chenopodium quinoa W.). Considered a sacred food to the Incas, quinoa is grown as a staple crop in many areas of the highlands (including Puno) and has exceptional nutritional qualities (NRC 1989a:149,153). It is unusual among grains because it is rich in protein[30] and fat, both of which are limited in Andean diets. Several Ura Aylliños claimed they did not grow quinoa because its harvest and processing was too troublesome.

Animal foods are eaten much less frequently than vegetable foods. Table 2.3 shows the numbers of animals

[29] Depending upon the size of the garden, people may also plant a couple of rows of corn and potatoes.

[30] Protein content and quality is very high in quinoa. For example, its protein content--on average 16 percent--is more than double the level in other grains (NRC 1989a).

Table 2.3

Animal Holdings in Ura Ayllu in 1986
(N=15 households)

	Number of Animals per Household					
	Cattle	Sheep	Camelid[a]	Cuy	Fowl[b]	Other
Average	1.87	5.67	0.87	9.33	1.8	0.47
Minimum	0	0	0	3	0	0
Maximum	4	17	7	21	6	2
Total	28	85	13	140	27	7

Source: Author's SES Questionnaire 1986
[a] Includes alpaca and llama. Only two households owned camelids, in both cases, alpacas.
[b] Includes chickens and ducks.
[c] Includes pigs (N=3), donkeys (N=2), and horses (N=2).

owned by the sample households. Every household raises guinea pigs but their consumption is limited to special ritual occasions. Cow's milk and chicken eggs were observed but their consumption is infrequent and in very limited quantities. Generally, most animals are raised for purposes other than food. Sheep, for example, are raised for wool and the dung fertilizer they produce. Animals are slaughtered for eating only when a special need or ritual occasion arise. During the harvest, people do exchange potatoes and corn for meat and cheese with the herding communities in the puna region. Most of the meat observed during the dietary surveys was obtained in this way.

Market foods

Market foods include those items purchased in stores. There are some eight to ten small stores in Ura Ayllu which stock items such as rice, wheat flour, pasta, condiments, and sugar which are widely consumed. Vegetable oil and canned milk are also available but are less frequently purchased. The stores also stock candy, beer, soda pop, alcohol, and non-food items such as kerosene, matches, cigarettes, school notebooks, and candles. These stores are located usually in the front room of a house and are open when there are household members present, generally during the early morning and late afternoon and evening hours. It is not uncommon for store owners to take items from their inventories for their own consumption.

There are a number of stores in Llaqta Ayllu as well. Some of these stores are quite large and stock a wider variety of food than those in Ura Ayllu. A number of stores and street vendors sell fresh produce, fruit, eggs, and cheese. Bread, which is baked in large adobe ovens on a daily basis, is a popular food and purchased frequently by individuals as well as store owners who then resell it. Large (100 pound) bags of sugar, flour, and rice are also purchased at wholesale prices in Juliaca by the men returning from the goldfields.

Market foods, especially rice, flour, pasta, and sugar, have assumed a major role in the Ura Ayllu diet (see Chapter 3). Although important and widely consumed, people continue to clearly distinguish this food from the food they grow. The starches, in particular, are called misti mikuy (mestizo or "white" food) in contrast to their own yana mikuy (dark or black food). Post-partum food restrictions, for example, prohibit the consumption of misti mikuy for several weeks. It is thought that misti foods will impede the healing process and make women susceptible to post-partum reproductive complications.[31]

Meals

Meal consumption can be divided broadly into two types: daily meals and ritual meals. Daily meals are eaten two or

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[31] See Weismantel (1988a;,1988b) for a detailed discussion of how food symbolizes asymmetrical social relations in the Ecuadorian Andes.

three times a day. When three meals are prepared, the first meal is eaten early in the morning, between 6 and 8 am. If a second meal is prepared at home it is consumed between noon and 2 p.m. Many times, however, lunches are carried to the fields where they are eaten during work breaks. These meals are called gogawi (Q.) or fiambre (Sp.) and consist of steamed tubers and toasted corn and beans prepared in the morning. The last meal of the day is eaten between 6 and 8pm. The timing of meals is slightly different when only two meals are prepared. In these cases, breakfast is served somewhat later in the morning, 8 to 9 a.m., and the evening meal is earlier, around 5 in the afternoon. With the exception of meals eaten in the agricultural fields, meals are eaten within the kitchen.

Daily meals eaten at home are structured around three different dishes: 1) tea, 2) soup, and 3) steamed tubers. Heavily sweetened herbal teas and toasted corn or habas (tostadu) are the "first course" and consumed while the rest of the meal cooks. The corn and beans are eaten dry or put into the cup of tea. Bread may also be served with the tea.

Caldu (Sp. caldo, soup) is the prominent dish in meals and is eaten at least two times a day. It is composed of both essential and interchangeable ingredients. A soup always contains water, salt, fat, collards, and some form of starch to thicken the broth. Starches may be ground toasted wheat (chaquepa), ground corn (either in its plain dry form or as chochoqa, corn that is blanched in its fresh state and

then dried in the sun and stored), wheat flour, rice, or noodles. Ingredients are then added to the thickened broth to give the soup additional texture. This category includes potatoes, oca, onions, carrots or other vegetables.

A second dish is usually served to complement the soup. This dish is served to each individual or shared among the household members and consists of steamed potatoes and oca called wayk'u (boiled tubers, from wayk'uy, to cook). The wayk'u is eaten along with the soup for home meals, and is basis of the meal or fiambre eaten in the fields. Wayk'u is eaten at a leisurely pace; tubers are selected one at a time, peeled, and then eaten in bites. Fresh oca are particularly prized for their sweetness and are picked out of the bowl first. Because wayk'u reflects a household's supply of fresh tubers, its preparation is seasonally variable.

Ritual food consumption is distinguished from the daily meal structure by the ways food is prepared, served, and consumed and the amount of food eaten. Ritual meals are highly formalized. Men and women sit in groups apart from each other and dishes are served by the hosts in a very solemn manner. The hosts do not join the crowd but remain in the cooking area except for serving. Guests are not expected to do anything but relax and eat. Depending upon the size of the group, meals are often cooked and eaten in the patio outdoors.

Athough ritual meals consist of foods eaten every day as well as others such as meat which are consumed less frequently, the discrepancy between daily and ritual meals is marked more by the quantity of food prepared and eaten and its presentation. Ritual meals consist of several courses. First, a large pile of steamed potatoes are placed on a llicla (woman's shawl) and put on the ground, in the middle of each group of diners (separate piles for women and men). In contrast to the wayk'u eaten every day, these potatoes are peeled prior to cooking and then boiled in salted water. These potatoes are referred to as papa monda and are eaten throughout the entire meal. Each person leans over to the pile, takes several potatoes, and begins to eat. Once eating starts, the hosts serve a second course of soup to each guest. When an individual finishes, the bowl is taken away immediately and refilled.

The third and final course goes by the name segundo, which means "second course." Soup and segundo is a typical sierran meal and is served in rural and urban restaurants throughout Peru.[32] Segundo is distinguished by its large serving of boiled rice; in Ura Ayllu, a vegetable stew of potatoes, pasta, and relish vegetables is served with the rice. A boiled potato or two placed on the side complete the dish. The segundo marks the end of the meal. People

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[32] Segundos are prepared infrequently as a daily meal. Women claim they prepare a segundo more frequently when their husbands are in residence. Segundos are eaten often by the miners both in their work camps and in restaurants.

remain seated until everyone finishes eating. When the last person has finished, the diners stand and thank their host.

To summarize, there are a number of kinds of foods and meals eaten in Ura Ayllu. Athough local foods appear to dominate the diet for most of the year, commercial foods are used increasingly to "legitimize" a meal as side dishes, ingredients or condiments. A soup of potatoes and pasta may not be considered complete or appetizing unless some pre-packaged chili powder is added. A tea without sugar is considered undrinkable. While in some cases these elements may not have nutritional significance, they are culturally important in defining what a dish or meal is or is not.

Foods are symbols of status in Ura Ayllu but the distinction between high and low status is not clearly defined. Not all local foods are "low status" and all market foods are not "high status." Potatoes are valued while purchased wheat flour is disdained (except for making bread) as a food of poverty. People are proud to say that they do not use flour in soup and in the next moment be embarrassed to serve me a soup made of chuño. They are ashamed by their regional nickname, "those who wallow in khaya," but lament the recent poor yields of the oca crops. The ambiguity people feel toward local and market foods may reflect the ways they think about themselves. As will be discussed in Chapter 4, there is a great amount of uncertainty and insecurity in Ura Ayllu, and it is expressed most clearly during the hungry season.

Materials and Methods

Research Design

The data presented here were collected in Ura Ayllu between July 1985 and January 1987. The research was designed to examine seasonal or intra-annual fluctuations in 1) dietary composition and adequacy, 2) intrahousehold food allocation, and 3) hunger. More specifically, this research explores how the articulation of seasonality and socioeconomic factors influence the nutrition of young children (two through six years of age). Both qualitative and quantitative methods were used in gathering this information.

Research was designed to capture intra-annual variation in dietary patterns and to examine the nutritional consequences of these patterns for household members. To document the nature and quantity of the diet over the course of an annual cycle, the 1985-86 agricultural year (planting, August to October 1985; harvest, February to June 1986) was divided into three phases or rounds (see Figure 2.8 above). Round One corresponds to the months of late February, March, April and early May 1986. It begins with the main potato harvest and continues into the subsequent months when oca and broad beans are harvested. Round Two includes the months of mid-May, June, July and early August and corresponds to the harvest of corn and the post-harvest period. This round also covers the time of the year when the migrant wage laborers, absent in the first round, are

returning to the community. The pre-harvest months of November, December and early January (1987) comprise Round Three of this study. Food intake data were collected on each of the sample households for one day during each of these phases.

To ascertain seasonal variation in nutritional status (measured by body weight and stature relative to sex and age), anthropometric data were also collected at different invervals throughout this period. Household members were measured twice, once in the post-harvest (May-July) interval and once during the pre-harvest period in December 1986.

Data Collection

The aim of this study and the kinds of questions to be addressed in the analyses that follow determined in large part the choice of methods employed and the selection of the sample. The research design and methods are similar to those used recently to measure food consumption and nutritional status in another highland community of Puno (Leonard 1987). In the following section, I describe the various methods used to collect the data presented in this study.

Food Weighing

All quantitative food consumption data were obtained by the method of exact or precise weighing (Pekkarinen 1970:153). This involved weighing each ingredient prior to cooking and then, when the meal was served, each

individual's portion of cooked food. Plate waste and all unconsumed food also was weighed. Containers used to hold food were weighed and their values subtracted from the food weight. A temperature-compensated, top-loading, spring Homs scale, graduated in two gram increments (maximum one kilogram), was used for all food weighings. The scale was frequently calibrated with standard weights to ensure consistent measurements. All weights were estimated to the nearest gram.

Each of the sample households asked to participate in the study was told the purpose, method, and duration of the project. Guarantees of confidentiality also were made at this time. The importance of preparing "typical" meals, that is meals that would normally be prepared for families at this time of year, was explained to the food preparer. These issues were discussed again at the beginning of each weighing visit. The similarity of meals and ingredients among households suggests that my requests were followed.

All food intake data were collected by the author and a trained assistant who doubled, when necessary, as a translator (Quechua to Spanish). In most cases, the assistant manipulated and read the scale while I recorded the information on a data collection form designed by the author. This division of labor was the most effective arrangement because it allowed me to take random ethnographic and dietary notes during the visit. A university-educated male from Llaqta Ayllu assisted in all

three rounds of data collection. At the beginning of the third round, a woman in her early twenties from Ura Ayllu was added to the research team. Only one assistant accompanied me during any visit.

The company of a local woman brought a different perspective to the visits. The female assistant was related to many of the sample families, which made the weighing visits seem more like a social call rather than a calculated appointment. However, her presence also created some problems. A number of women, typically non-relatives, were reluctant to have her observe their meals for fear that the assistant might gossip about them. While some of the women's reluctance may be attributed to personal reasons, it should be remembered that the last measurement round covered the pre-harvest period, a time when some families were experiencing food and cash shortages. After talking with some of the participants I discovered they did not feel this way about me or my male assistant. They claimed that they had been assured of our confidentiality because we had not "talked about them" after previous visits. Thus, I compensated by using the male assistant during visits with families facing greater economic hardship and the female assistant with all others.

The majority of the weighing visits were arranged one to three days in advance. My assistant and I would arrive at the home early in the morning before the woman began to cook and would remain in the home until the meal was

finished and the leftovers stored. We would return to the home at designated times, usually midday and evening, to measure all subsequent meals. Overall we typically spent seven to nine hours a day with the household.

Methodological Considerations

There are various methods used to estimate dietary intake and each method has advantages and limitations. As there is no ideal or error free method for collecting food consumption data (Quandt 1987:67; Sanjur 1982:171), the researcher must choose the method that is most consistent with the objectives of the study, the size of the sample needed, the resources (e.g., funding and personnel) available, the tolerance of the subject population and their willingness to assist in data collection (Pekkarinen 1970:146). The general conclusion of researchers involved in food consumption studies is best summarized by Quandt (1987:68) who states that "the more detailed the desired data, the more expensive, time consuming, and subject to error the method required." This is because the more precise methods may interfere with normal consumption patterns. The following section examines some of the limitations and errors associated with the food weighing method as employed in this study.

While the food weighing technique recommends taking into account foods or meals eaten outside the home (Pekkarinen 1970; Weiner and Lourie 1981), the dietary

intake data presented here include only foods and meals measured in the home. There are two main reasons for this omission. One, household members usually disperse after meals to work thus making it impossible for a single researcher to follow them all throughout the day. Two, attempts to obtain accurate recall assessments were largely unsuccessful. In general, people either had difficulty estimating amounts of food eaten or seemed genuinely annoyed with the questioning. Given the trouble involved in the food weighing method and the need to follow the same sample of households over time, it was decided best not to jeopardize a long-term relationship by pushing people's cooperation beyond its limits.

It is important, therefore, to account for this measurement error when interpreting the dietary analyses that follow. Since the error is consistent across all households and all rounds, the food consumption data presented here may best represent minimum intake and the strongest (e.g., most reliable) generalizations will be comparative ones, within the sample.

Given my extended presence in the community and experience with individual households, I would estimate that the amounts of food eaten between meals was calorically insignificant in most cases. Meals eaten outside the home, usually in the fields, consist of the same kinds of foods (e.g., tubers, grains or legumes) but are smaller and less varied than those eaten at home. Thus, the underestimation

of total daily intake is not as great as it would be if other, more nutrient-dense foods were consumed at these times. Foods eaten between meals may be more important in the case of young children, but it is difficult to estimate the nutritional significance of snacking with the data at hand. This issue is discussed in Chapters 3 and 5.

This problem is further compounded by the fact that people may eat only two meals per day. It may be difficult, therefore, to unravel whether missed-meal day totals actually underestimate consumption or whether they fall within the range of "normal" consumption when only two meals are consumed in a day. This issue is addressed further in the analyses.

Another limitation associated with food consumption methods involves the length of the recording period. It is generally held that the recording period should be long enough to obtain reliable information on "usual" consumption (Pekkarinen 1970:156; Quandt 1987:70). Intake data based on one-day surveys (e.g., 24-hour recalls) tend to overestimate intraindividual and interindividual variation (NRC 1986; Quandt 1987). The extent of overestimation, however, depends largely on the food habits of the population surveyed. Unlike Western diets, the diet of Ura Aylliños, within a season, is based on a very limited variety of foods. Thus, it was felt that one-day surveys repeated on the same households at different points of the year would yield reliable estimations of dietary intake. The approach

has been used in a number of dietary studies in the Andes, and has provided reliable results (e.g., Leonard 1987; Marquis 1984; Thomas 1973).

Another problem associated with the food weighing method involves alterations in the diet during observation. The food weighing method is invasive and time-consuming for the household members. Informants may attempt, therefore, to streamline the process by simplifying their diet or, in other cases, impress the researchers by preparing more elaborate meals than would normally be made. In the present study, consistency in the kinds of foods and meals consumed across sample households suggests that the method did not alter dietary habits. Our presence in the home throughout most of the day made it difficult for women to deprive household members for the sake of simplifying the diet. On the other hand, there was a concern, particularly at the beginning of the survey, that women might want to cook larger or more elaborate meals than usual because of my presence. Various strategies were used in this study to discourage women from changing the diet during the weighing visits.

First, every effort was made to make the visit informal and pleasant and to demystify the procedure as much as possible. It was felt that if the household members were comfortable with our presence, they would not try to change their lifestyles or to simplify their diet. While the main purpose of the visit was to measure food, we tried to make

it a social occasion as well. We would engage in very lively conversations, play with the children, and help at times in the preparation of the meal (e.g., peel potatoes, shuck corn). The scale was placed close to the woman so she could easily observe our actions. Children, at first frightened by our presence and the scale, quickly became comfortable with us and began to play with the scale and to weigh all kinds of objects (cups, shoes, rocks, etc). After the first meal or two, the process became second nature for everyone involved.

A second way in which we attempted to discourage potential alterations in the diet was to decline to eat with the family during this particular visit. This decision was based on the assumption that people would prepare more elaborate meals than usual if they knew we would be eating with them. We discussed this point with each women prior to, and again during, each visit. Although the women agreed that they would indeed cook differently if we were to join them, our inability to share the meal was one of the more difficult aspects of the procedure for them to understand. As in many cultures, offering food to a guest is a salient feature of Andean hospitality. We found it most effective, therefore, to acknowledge our behavior as aberrant and socially inappropriate, and to blame our rudeness on the excentricities of Western culture and scientific procedures. We also found that offering an open invitation to eat together at another time, when I did not have to weigh food,

relieved much of the discomfort people felt when they ate in front of their "guests."

While in most cases this strategy worked successfully, in others our polite refusal of food completely destroyed the relationship. In these cases, the women never outwardly refused to participate but their behaviors communicated their intolerance of our anti-social behavior very clearly. When we returned to the house for the next meal, our knocks would go unanswered or we would be told, usually by a child sent by the mother to talk with us, that the family would not be eating at home for the remainder of the day. These households were eventually dropped from the sample and replaced with others.

Subsequently, when we found ourselves in a situation where our inability to share the meal became problematic, we would accept very small amounts of those foods which were most abundant and least expensive in the diet. These foods usually consisted of locally-grown tubers, such as potatoes or oca, toasted corn or broad beans. A hot beverage, typically an herbal tea, was also frequently offered during the morning meal to help allay the cold temperatures. In general, we took only those foods which appeared to us destined to become leftovers thereby not reducing any individual's food intake at the meal being measured. In a few cases, however, extra food was prepared for our consumption. This happened most frequently when tea was offered to us. In these cases, our portions were measured

along with and later subtracted from the rest of the family's portions.

This "eating strategy" reflected a primary methodological concern: to eliminate as far as possible observer bias without offending, and thereby jeopardizing, a long-term relationship with the family. It was interesting to note during the research that our inability to share a meal was a problem for only some of the families. While everyone in the study said they "understood" this condition, people reacted to it in different ways. Some women, after making an initial invitation to which we politely declined, seemed to realize that we were indeed serious in our request (and not just being polite) and would cease to offer food at subsequent meals. Others would make an obligatory offering at each meal but, knowing that we would decline, would not push the issue further. Aside from those few women who were unable to accept this situation (discussed above), still others appeared genuinely hurt by our refusal of their food and hospitality. In these cases, the acceptance of even a meager amount would typically assuage any social tension that existed. In fact, we found that this strategy so greatly enhanced the social interactions during mealtimes that we began more readily to accept small amounts of food when offered.

Qualitative Methods

The amount of time spent in a home during a weighing visit also permitted the use of other methods for gathering

information on food production, preparation, and consumption. The warmth and intimacy of the kitchen created a relaxed environment in which to conduct unstructured interviews and discussions with household members on a wide range of topics.[33] Observational information on a variety of household-based activities such as food preparation and meal consumption, child care practices, and interactions between household members also was gathered during these visits. These data are important for the interpretation of the food intake analyses.

Anthropometry

Standard anthropometric measures of height and weight were collected on sample household members during the study. The protocol recommended by Weiner and Lourie (1981) was followed for all measurements. Tools used include an anthropometer and a platform, digital-electronic bathroom scale (half pound increments).[34] The first round of measurements of household members were collected within the home. The second round of measurements took place in the nursery school (wawawasi) room located in the community meeting hall. Measurements not obtained in the meeting hall (due to absence) were gathered in the subjects' home. All subjects were measured in clothes (excess clothing such as

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[33] See Chapter 4 for a description of Ura Ayllu kitchens.
[34] The scale was rated by Consumer Reports magazine to be highly accurate and consistent over repeat weighings.

heavy sweaters, shawls and jackets were removed prior to measurement) and without shoes.

Economic Questionnaire

A questionnaire relating to household economic status was administered at the end of the study. Information on land and animal holdings, labor (wage and other), wage expenditure and material goods was gathered for each of the sample households. This information is used to stratify the sample according to economic status in the dietary analyses.

Analytical Methods

Food weights were converted to nutrient values (kilocalories) with the use of published food composition tables for the Andean region (Collazos et al. 1975 for Peru; Ministerio de Previsión Social y Salud Pública 1979 for Bolivia) and Latin America (Wu Leung and Flores 1961). The USDA food composition table was used to calculate the nutrient content foods not included in the other publications (Watt and Merrill 1975). A list of the foods observed during the dietary survey and the sources used to calculate nutrient intake are provided in Appendix A.

Conversion of individual food weights to nutrient values was calculated using a spreadsheet (LOTUS 123). Statistical analyses of these data were performed using the SYSTAT 4.1 program.

Comparison of caloric intake to caloric requirements provides an estimation of dietary adequacy and levels of

malnutrition. In this study, caloric intakes are compared to predicted caloric requirements calculated specifically for another highland community in Peru by Leslie et al. (1984). The advantage of the Leslie Model is that it accounts for population differences in activity levels as well as demographic, anthropometric, and environmental factors (ibid.; Leonard 1987:58). This procedure is discussed in greater detail in Chapter 3.

The anthropometric data also were analyzed using the SYSTAT 4.1 program. All anthropometric measures were converted to Z-scores (standard deviation units) according to age- and sex-specific means provided by Frisancho (1990). Standardization of these data permit individuals to be pooled across age groups, thereby facilitating statistical analyses. These issues are discussed further in Chapter 3.

The Sample

Sample Selection

Prior to the selection of the sample households, a map of Ura Ayllu was drawn by myself and a fellow researcher during the first month of the PSE project in August 1985. The map was re-checked by an independent observer in December. Numbers were assigned to each housing compound (total of 163) in a south to north orientation. If a house was omitted from the original map, it was drawn in at this time and given the next consecutive number.

A random selection (with replacement) technique was used to obtain the sample households. To select the random sample, 220 (in the event that many housing compounds were omitted in the original drawing of the map) pieces of paper were numbered one to 220. The papers were placed in a box and drawn, one at a time, each time with all 220 pieces present. The order in which they were drawn was recorded.

Once the household had been selected, it was censused to determine whether it met the criteria for inclusion in the study. The criteria used were 1) presence of at least one child between six months and four completed years of age and his or her mother, and 2) permanent residence in the community. The sample thus includes those who migrate seasonally but exludes school teachers who are neither from the region nor considered permanent members of the community.

This age range was chosen for two main reasons. One, it covered the various stages of toddler nutrition--from mixed eating (both breastmilk and non-breastmilk foods) through the time of complete weaning. While breastfeeding in the Andes is prolonged (usually up to 18 to 24 months of age or until a women becomes pregnant), I was not absolutely certain at the onset of the research whether Ura Ayllu women followed this trend. In the spirit of caution I set six months as the lower age limit in order to capture the period when children make the transition from a predominantly breastmilk diet to a diet composed primarily of "adult" or

household foods. As I discovered later in the research, my caution was overly generous; the youngest child included in my analyses is just over one year of age (see below for a description of the children included in the study).

The second reason for selecting this age group was for comparative purposes. Child mortality rates are calculated for children one through four completed years of age. Thus, the nutritional status measures from this study could be compared to regional or local rates of child mortality and provide a good estimation of the health status of the Ura Ayllu population.

The first 20 households that met the selection criteria and agreed to participate were included in the sample. Four of these twenty households (20%) dropped out of the study during the first round of measurements. Two additional households were added in the same manner, one of which dropped out after one weighing. The remaining 17 households participated throughout the duration of the study. Two of the 17 were omitted for analysis as the child (in both cases the only child) continued to breastfeed exclusively during all three measurement rounds.

The overall dropout rate is high (23%) but not unusual considering the dietary method used in the study or the lack of familiarity with scientific procedures in this population. As discussed earlier, food weighing is invasive and time-consuming and requires a great deal of flexibility and cooperation on the part of household members (as well as

the researcher). While the dropout rate may suggest that the sample is biased toward those with whom I had a personal relationship, this is not the case. Of the 17 households that were followed throughout the entire study period, nine (53%) were households with which I had no previous contact and eight (47%) were households with which I had either minimal previous contact or established relations.

All households were selected from the five sectors (barrios) comprising the main residential center of Ura Ayllu. The sixth sector or anexo of Aripo was not included in the sampling pool due to its distance (approximately a three hour walk) from the main community. Because of the distance from Ura Ayllu and the inability of the assistants to leave home for several days at a time, it was decided to choose a sample from the main community only.

To ascertain the representativeness of the sample, Table 2.4 illustrates the distribution of sample households relative to the Ura Ayllu population. The first column of figures shows the number (and percent) of sample households in each barrio. Household totals for the community were taken from the 1985 community census and are shown in the second and third columns. The third column labelled "Ura Ayllu households with children" represents households that listed dependent children in the census. Although the ages of children are not included in the census, comparison of the sample to these figures should provide a more accurate estimation of representativeness since only households with

Table 2.4

Distribution of Sample by Barrio

Barrio	Sample Households n	(%)	Total UA Households[a] n	(%)	UA Households with children[b] n	(%)
Alto Quinray	2	(13)	25	(15)	16	(13)
Abajo	5	(33)	42	(25)	30	(25)
13 de Julio	1	(7)	11	(7)	8	(6)
Castilla	3	(20)	38	(23)	28	(23)
Sollanque	4	(27)	52	(31)	40	(33)
Total	15	(100)	168	(100)	122	(100)
Percent		100		9		12

Source: Household totals for each of the barrios were taken from the 1985 Padron Comunal de Ura Ayllu.

[a] Numbers reflect total households (heads)

[b] Numbers in this column include only those households that included dependent children (ages not specified) in the census

children within a certain age group could be chosen for this study. An examination of the percentages shows, with the exception of sector Abajo, similar distributions of households within each sector. Overall, the sample represents nine percent of all Ura Ayllu households and twelve percent of households with dependent children.

A description of the children included in each round of the study is presented in Table 2.5. The identification numbers, sex, age, and breastfeeding status for each child are listed according to age. For analytical purposes, ages are calculated from the date of birth to the mid-point of the dietary survey period--1 August 1986. Children who were still breastfeeding at the time of food measurement are indicated by an asterisk. It should be noted, however, only those breastfeeding children who were eating regular meals with the family, and nursing irregularly, are included in the sample. All of the five children who were breastfeeding in Round 1 had been completely weaned by Round 3 of the study. Energy intakes were calculated with and without the breastfeeders to determine whether there were caloric differences. Intakes were slightly lower when breastfeeders were excluded, therefore, they remained in the sample.

The age and sex distributions of the children for each round of measurement are presented in Table 2.6. The age groups (1-3 years and 4-6 years) are those used by the FAO/WHO and the NRC to estimate recommended daily allowances of nutrients. Food consumption data were gathered on 25

Table 2.5

Characteristics of the Sample Children by Round

HH#	IND#	SEX	AGE	Present Round 1	Round 2	Round 3
4	5	M	2	X*	X	X
5	4	M	2	X	X	X
6	5	M	2	X*	X*	X
7	7	M	1	X*	X*	X
8	3	F	2	X	X	X
9	3	M	2	X	X	X
10	4	F	2	X	X	X
13	8	M	2	X*	X*	X
1	8	M	3	X*	X	X
12	7	F	3	X	X	X
14	6	F	3	X	X	X
15	3	F	3	X	X	X
3	5	F	4	X	X	X
5	3	M	4	X	X	X
10	3	M	4	X	X	X
11	7	F	4	X	X	X
13	7	F	4	X	X	X
1	7	M	5	X	X	X
2	2	F	5	X	X	X
4	4	F	5	X	X	X
6	4	M	5	X	X	X
7	6	F	5	X	X	X
3	4	M	6	-	X	X
11	6	M	6	X	X	X
14	5	F	6	X	X	-
15	2	M	6	X	X	X

Note: Asterisk signifies breastfeeding (see text)
X = present; - = absent

Table 2.6

Children in the Study by Measurement Round

	Number of Children per Round					
	Diet Survey Round					
	One		Two		Three	
Age Group	M	F	M	F	M	F
1 - 3 years	7	5	7	5	7	5
4 - 6 years	6	7	7	7	7	6
Total	13	12	14	12	14	11

children in rounds one and three and 26 children in round two. The absence of two children (a six year-old male in round one and a six year-old female in round three) from the community accounts for this difference between rounds. During each round, there are twelve children in the 1-3 age group (seven males and five females). Representing the second age group, 4-6 years, are thirteen children (six males and seven females) in round one, fourteen children (seven of each male and female) in round two, and thirteen children (seven males and six females) in round three.

While the number of individuals in each cell is small (presenting several statistical problems), it should be noted that male and females in these two age groups are collapsed into one group for the purpose of most of the nutrient analyses.[35] Ignoring sex in these age groups yields larger sample sizes than the table indicates.

The Households

In the following section I present vignettes of the fifteen households included in this study. These short descriptive narratives illustrate the diversity of the families and highlight the differences, as well as the similarities, in household composition, subsistence strategies, and socioeconomic levels.

Household 1 Aurelia and her husband José are a middle-aged couple with a large family. In October 1986, at

[35] Males and females were kept separate for the analysis of sex differences in energy intakes (see Chapter 3).

the age of thirty-six[36], Aurelia gave birth to her eleventh child. Of these eleven children, nine survive: two daughters (ages 19 and 12) and seven sons (ages 17, 14, 10, 8, 5, 3, and an infant born in October 1986). Neither Aurelia nor her husband have any formal education; both are monolingual Quechua speakers. Neither the husband nor the eldest son were ever present during our food weighing visits, thus my knowledge of them is sketchy at best.

None of the children have yet married and thus all remain as household dependents. The husband and eldest son spend about six months of the year gold mining in Maldonado; the eldest daughter migrates periodically down valley (Sandia) to work for others, for example in the harvest of corn and coca. During the months of school vacation (January through March), the 14-year-old migrates to Maldonado to work for the family at hourly wages. Only some of the wages earned by these individuals are funneled back into the household coffers. After covering transportation and living costs, the older children retain part of their earnings for their own use (e.g., to purchase clothing, radios, bicycles, etc.).

The rest of the children and Aurelia remain in the community and dedicate their time to agriculture. The school-age children attend the Ura Ayllu primary school and work for other families, herding animals, receiving payment

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[36] Ages are calculated as of August 1, 1986, the mid-point of the dietary study.

in kind, usually food. Both Aurelia and her husband are from Ura Ayllu and cultivate chakras[37] brought into the marriage from both families. They possess coca and coffee lands in the yunka[38] that have become overgrown and non-productive since José began to migrate to Maldonado. The family owns no livestock but like all families have numerous qowi[39] which they raise for sale as well as their own consumption. Aurelia reports that while their landholdings are numerous, they are not sufficient for such a large family. Thus, the meager cash and payments in kind earned by family members are crucial for meeting household needs.

Aurelia is not particularly close to her natal family. Her father left the family when she was young and her mother subsequently started a new family with another man. Aurelia was moved to her father's family household and was, therefore, isolated from her mother and her half-brothers and sisters. While she maintains relations with her widowed mother (some of Aurelia's children spend the night with their grandmother and help her with household chores), Aurelia's relations with her half-siblings are tenuous at best. Thus, Aurelia is unable to call upon the assistance

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[37] Agricultural field.

[38] Tropical foothills of the Andes; also referred to as montaña. It is the region where coca leaf, coffee, and tropical fruits are grown.

[39] Guinea pigs; also spelled as cuy. Domesticated in the Andes, qowi are kept in the kitchen and fed with food scraps. Almost every household raises qowi which are usually eaten on special occasions, and sold for extra household cash.

of her siblings or nieces and nephews for help in agropastoral tasks.

Aurelia was always busy working in the fields and caring for her children. She frequently appeared harried and there was usually a fair amount of chaos in the house. While the older children worked and took care of themselves and their younger siblings, the younger children (two sons ages 5 and 3) were often found near Aurelia, clamoring for her attention. Although enrolled in primary school, the 8-year-old spent much of his time with his younger brothers, pestering them to the point of tears. Aurelia was adept at ignoring the frequent bickering that went on between these siblings and would only interfere in a fight when the youngest one began to cry. In these cases, she would intervene and take the youngster away from his brothers. Although the sibling antagonisms were frequent, the young children did cooperate with their mother and took on responsiblities when needed.

The overall scene of noise and chaos took its toll on Aurelia who often complained about the responsibility of caring for so many children. She asked me on several occasions for information on birth control and regretted that she had not taken some action before getting pregnant again. Aurelia looked very tired and worn. Her hair was very thin and she sported two very short and thin braids instead of the long, thick tresses usually seen on adult women. Like most Ura Ayllu women, she was thin but the

clothing hid the slenderness, making her look robust and heavier than she really was. My overall impression of this family is that they are quite poor, their resources stretched to the limit. They possess few material possessions and their clothing was unusually tattered and worn even by local standards.

Household 2 Rosa, age 30, is a widow who lives with her five-year-old daughter. Her husband died in 1982 reportedly from a disease he contracted when working in Maldonado. Rosa and her daughter currently reside in the house of Rosa's parents, which is quite large. Previously, she and her husband lived in another house, near the river, which was destroyed by a rockslide in 1984.[40]

Rosa is a vivacious person with a good sense of humor. She attended grammar school and speaks Spanish although like other bilingual women is hesitant to do so. She usually dresses in knee-length pollera skirts (i.e., chola-style clothing) although she wears the more traditional Cuyo Cuyena dress during special occasions. Unlike other women, Rosa has significant contact with communities outside the region. She has land she cultivates in Ura Ayllu but supplements her income with commercial ventures. She travels between San Juan and Juliaca, buying local goods (usually agricultural products) and reselling them along her

[40] Rosa is the youngest child or chanaku of her family. The chanaku usually remains in the family home and cares for the parents in old age. Although Rosa and her husband built their own home, Rosa returned to her natal home when her own was destroyed.

route and within the district. Rosa also owns livestock (some cattle and sheep).

Rosa is a respected member of the community and is close with her sisters and their families who assist her in her agricultural chores. She engages in ayni relations with other families as these are important for her given the shortage of labor in her household. She is politically aware and was outspoken about her views during the mayoral race held in late 1986. She is involved in the Wawa Wasi program which her daughter attends.

Rosa sponsored her family's All Soul's Day rite in November 1986. This involved making the ritual mesa for the deceased in her home, organizing the graveyard visit and providing meals and drink for all the participants that night and the next day. Thus, despite the absence of a husband, Rosa retains an independent household and assumes family ritual obligations that normally would be undertaken with the assistance of the male.

Household 3 Adela and her husband Agustín have four children of their own--three sons (ages 10, 6, and 1) and one daughter (age 4) and a teenage daughter brought into the marriage by Adela. Two other daughters died at a young age. Adela is slightly older (33) than her husband (30) and is as serious in her behavior as her husband is playful. Adela's conservativeness in dress and attitude stands in contrast to her husband's progressive ideals and materialistic orientation. Adela has received no formal education, is

monolingual, and dresses in the traditional Cuyo Cuyo clothing. She has no desire to travel outside the region and takes primary responsibility of agriculture and the animals and the running of the household.

Adela is from Llaqta Ayllu and lived with her mother and sister after her father died; Agustín is from Ura Ayllu. Adela and Agustín lived in the Pueblo for several years before constructing their own home in Ura Ayllu. This house was subsequently destroyed in the landslide and the family built a new home, in a different location, where they currently reside. The new home is large and roofed with corrugated tin (calamina), a mark of local affluence. They are continuing to work on the interior and were installing a cement floor on the ground level of the residence during July 1986. Agustín is a very active husband and provides well for his family. He and his brothers spend five to six months of each year in Maldonado where they own claims of land. As owners, they hire relatives and close friends to work with them and from whom they receive a percentage of their gold income.

This family is one of the more well-to-do families in the sample. Economically, they have incomes from a number of different sources. Agustín is also active in the community and has held a number of different posts in the community. He is currently treasurer of the community and secretary general of the regional peasant federation. He is a representative of the Banco de Materiales and was

intending to sponsor the upcoming fiesta of Santa Cruz (the patron saint of Ura Ayllu). During 1986, he was included on the United Left ticket for the mayoral race in Llaqta Ayllu. To his surprise, their ticket won the election and he was sworn in as lieutenent mayor on January 1, 1987. While happy with the political results, his new governmental role created a personal conflict for him since his new responsibilities would leave him less time for gold mining. I left the field a few days after he took office and he was still trying to imagine how he would manage the two activities.

Household 4 Francisca (age 28) and her husband Roberto (age 31) have three children: a ten-year old son, a five-year old daughter, and a two-year old son. Another son died during infancy, a few months after birth. Francisca was born and raised in a community to the north of Ura Ayllu and thus has no direct kin living within the community. The family cultivates her landholdings in her natal community. Francisca attended elementary school for four years and received training in western Puno to become a seamstress. Francisca usually wears chola clothing, with bowler hat, but is very reluctant to speak Spanish, although she understands it. Her husband completed elementary school and attended high school for two years before training to be a lay health worker.

Francisca's husband is somewhat unusual from other men his age in that he does not like to mine for gold and will

only go to Maldonado if no other opportunity for earning money presents itself. He has worked as an agricultural technician for state developmental projects in the district. Roberto's experiences outside the community and his desires to acquire many of the material trappings of urban life distinguish him and the family from others in the community.

The children all appeared to be healthy. Both parents are tall and heavier than most in their cohorts, and the children also seemed bigger than others their age. The eldest child was not comfortable with our presence and would visit his grandmother whenever we came to measure the meals. The younger children were very quiet and never lost their shyness around us even though the parents were at ease.

Household 5 Felicia, age 27, is the mother of three children: two sons aged four and two, and a daughter who was born in July 1986. Both she and her husband, Mario (age 25), are from Ura Ayllu and both attended elementary school for five years. They built a new home on the pampa near the river and are continuing to make improvements to the home. Felicia's father-in-law lives with them and helps out with agricultural tasks and tending the sheep. Mario migrates seasonally to Maldonado to work in gold mining while Felicia remains in the village to care for the fields and animals. Felicia wears typical Cuyo Cuyena clothing and is able to understand and speak some Spanish.

Felicia is quite close with her natal family and her younger brothers often help her with her farm work; they are

frequent visitors to her home. Felicia is a warm and outgoing person with a quick sense of humor. Her mother is similar and as the mother of a son attending university, she was a stolid defender of my work. Felicia was easy to talk with and was a good informant. She asked me to be the godmother of her newborn daughter and we performed the ununchasqa (lay baptism done soon after birth) in the kitchen during one of our visits. Felicia died in 1988 from complications following child birth. She was 29 years old.

Household 6 Eugenia, age 26, looks older than her age indicates. She is the youngest child of a large family who has longstanding residence in the community and who owns large amounts of land. Her husband Ubaldo is older than she (41) and is from Cusco. She and her husband have three children, a daughter (age 7) and two sons (ages 5 and 2). Eugenia's adult brother, who is considered mentally handicapped, lives with her and works for day wages (jornal) for other families in the community.

Eugenia had two miscarriages, one in November and another in August, and was quite upset with the experience. Relations with her siblings and their families do not appear to be good. According to her reports, she is quite isolated from them and is rarely invited to participate in family matters. She feels quite a bit of resentment toward her family, and was very upset that no one came to help her during her incapicitation following her most recent miscarriage.

Her family lives in her natal home, left to her by her father, whom she cared for after her mother died. The house appears to be in some disrepair although many of the older homes appear this way when compared to the newer-built homes that are sprinkled throughout the community. Despite the appearance of poverty, the family owns significant amounts of land (all of which is inherited through Eugenia) both in the estancia and Aripo as well as in the jungle below. Eugenia enjoys talking about her trips to the coca and fruit fields that she made with her father when the fields were still being cultivated. Although she retains some of these fields, the family has allowed the fields to become overgrown as they find gold mining more productive. In 1986 the family was one of the sponsors for the large Rosario festival.

Household 7 María Elena, aged 43, is the mother of eight children. Her husband, Tomás, is originally from Cusco and they met when living in Arequipa, Peru's second largest city, located south of Lima. Five of the eight children live in Ura Ayllu; the three older children--all males--continue to live in Arequipa. Three of children residing in Ura Ayllu are sons, ages 12, 9, and 1; the two daughters are 15 and 5. The family lives in the home of María Elena's mother, an old house located at the top of the village. María Elena's mother continues to reside on the premises, but lives and eats in her own kitchen. María Elena's family has taken over the use of the main

residential building and constructed their own kitchen, a small make-shift lean-to.

The story of this family is an unusual one for Ura Ayllu. As a teenager, María Elena was the object of a family scandal which forced her to leave the community. She fled to Arequipa where she married, began her family, and worked for many years before returning to Ura Ayllu in the early 1980s in the hopes of finding more economic security. All of the children, except the youngest, were born in Arequipa, and thus were not fluent in Quechua and were much more comfortable speaking Spanish. The eldest son, Oscar, initially struck my attention because of his command of Spanish, which he spoke better than most adults. He was a hard-working student and when I first met him, he was wanting to seek admission to a high school in Arequipa. María Elena could not afford to let Oscar go to school in Arequipa because of the costs and her need of his labor here. She suggested that he stay in Cuyo Cuyo until he completed high school and then return to Arequipa.

The return to Ura Ayllu was not easy for the household and they struggled to provide themselves with enough food. One of the problems related to María Elena's rights to family lands which were being used by her brother's family, who was unwilling to relinquish them for María Elena's use. She ultimately got to use some lands but they are generally very small plots making it difficult to cultivate enough food for her large family. The issue of her legal rights to

certain lands was still in dispute when I left (she basically only had the privilege of using lands her brother didn't need). María Elena's husband has, according to her, a "vicio" (vice, in this case a drinking problem) and can be an unreliable family member, spending his wages on alcohol.

Because of their precarious land situation and because of the need to earn cash, her husband worked regularly. He had years of experience as a mason (because it is a skilled occupation he is referred to as maestro) in Arequipa and was therefore sought out to do the finishing cement work on houses and other kinds of specialized construction labor. He sold his labor on a regular basis and during the dry season was usually booked up with work. The two older children also worked at odd jobs for families both in Ura Ayllu and in Llaqta Ayllu. They both attended high school but on weekends and during the vacation they sold their labor, either on their own or with their father.

Life was difficult for the family in many ways. It was hard for María Elena to return to Ura Ayllu after leaving in disgrace many years before; people gossip shamelessly and her relations with her natal family were tenuous at best. Since her husband was an "outsider," he had no lands to bring into the household and he had to work hard to be accepted. Their life in Arequipa was poverty stricken, thus the return to Ura Ayllu where "one can at least eat." They were going through a difficult transition fraught with strife with María Elena's family.

Household 8 Hilda and her husband Fermín are both 22 years of age and beginning to form a family. They have two young children: a daughter 2, and an infant son, 6 months, who was born during the Carnival fiesta in February (1986). Hilda's husband spends much of his time away in Maldonado earning cash so they can build their own house and start an independent household. They are currently living with Hilda's mother-in-law (Vicencia) and her two unmarried sons and a mentally handicapped sister. Hilda is a quiet, soft-spoken woman who, while acting as a good daughter-in-law, seems to get along well with Fermín's mother. When Fermín is at home, Hilda cooks separately for them but since he was never there at any of my measurement visits, I only saw her interact with her children and in-laws. Hilda and Vicencia shared cooking and meal preparation, child care and the agricultural work for the household. Vicencia is much like Hilda, soft spoken but talkative and took great delight in caring for her grandchildren.

Household 9 Virginia (22) and her husband Máximo (26) are the parents of one child, a 2 year-old son. Virginia gave birth to another child in 1987, after I left the field, but the child died shortly after birth. Máximo is the brother of Agustín (household 3) and like his brother is very involved in gold mining. He is an entrepreneur, hiring the labor of others in his plot in Maldonado. He has been quite successful in his mining efforts and as a result he and Virginia constructed a new home on the edge of the

road. It is a large, three storey house and innovative in style. One enters from the street level to the second story and must climb down a ladder to get to the kitchen on the ground level in the rear of the house. They own several beds and kerosene lamps and radios. Both he and Virginia are quite active politically but have not yet accumulated community cargos.

Virginia and Máximo are quite social and when Máximo is home, there are frequent and numerous visits by relatives and friends. Virginia often complained of the quiet and lack of conversation, music, and company during the months of Máximo's absence. During Máximo's out-migration, Virginia relies heavily on relatives (family and compadres) with the agricultural work. Due to their economic situation, Virginia also is able to hire people to work. Her husband leaves her with a well-stocked larder and plenty of firewood before he departs for the season. The affluence of this young couple is quite striking.

Household 10 Vilma and her husband Francisco are a young couple (ages 26 and 29) with two children, a boy age 4 and a girl age 2. Vilma experienced a miscarriage late in 1985 and gave birth to another daughter in 1987, after I left the community.

Their house is new and is located directly on the road. They continued to make improvements on the house throughout year. Francisco attended primary school and later went to Arequipa, where he lived with his uncle, to train as a radio

technician. He met Vilma when he returned to Ura Ayllu on vacation and they later married. He never returned to Arequipa to resume his studies.

They have a moderate cash income from gold mining (jorge) and own several manufactured beds, a wardrobe, cassette player, triciclo[41], and other consumer items. Francisco serves as animador (lector) at the local Catholic Church. The family is oriented to the national society and economy and aspires to a mestizo lifestyle. Although María Elena usually wore typical Cuyo Cuyeña dress, she would sometimes dress in a pollera and bowler hat, especially when her husband was at home.

Francisco migrates to Maldonado where he has a small piece (corte) of land, given to him by his compadre. Vilma remains in the community and takes care of the fields, animals, and her children. The family owns coca, fruit and coffee fields in the yunka but they have abandoned them in favor of the more lucrative pursuit of gold. Francisco did have his eye on a large (three hectares) piece of land in San Juan that has plantings of coffee, oranges, and bananas and house ready for habitation. He said the location of this large plot was convenient, a few hundred meters from the road, and that he would like to purchase it. (This was somewhat confusing since they own a number of plots already. I understood that these were not as convenient and he was

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[41] Three-wheeled vehicle with a platform used to transport goods and people.

less inclined, at this time at least, to exert the time to clean them up and make them productive again).

Vilma and Francisco are affectionate with their children and take pleasure in watching their antics. Vilma was close with her mother who came to visit often but had a much less amiable relationship with her husband's family.

Household 11 Juana is 31 years old and has six children. Her husband Edgar is 36 years old and is from Aripo, Ura Ayllu's anexo located down valley. They constructed their home on the pampa. It is set back amidst a stand of eucaplytus trees and provides a sense of privacy that many of the homes do not. The grounds around the house as well as the structures themselves are quite large. They have the usual two-story house and separate kitchen, but also have another smaller two-story structure where the beds are located. Thus, the large "house" is used more as the storage area with sleeping and cooking performed in the other buildings.

Juana is the sister of Rosa (household 2) and like her is close to her natal family, especially her sisters. Their eldest child is a daughter who is thirteen and attends the Ura Ayllu grammar school. Following her there are three sons, ages 11, 9 and 6, and two daughters, ages 4 and 1. The 4 and 6 year olds are included in the dietary analyses that follow.

Juana has received no formal education and her husband attended elementary school for three years. She wears

typical Cuyo Cuyo dress and speaks no Spanish. She is a very pleasant person who runs an efficient household but can laugh easily at her children's jokes and antics. I did not know Juana prior to selecting her household for study. Nevertheless, she was very cooperative with the study and it was always a joy to visit her family. The children were animated and overcame their fear of us very quickly.

Household 12 Isabel and her husband Jaime (both 35) live next door to Juana. They have five children: two daughters, 14 and 3, and three sons, 16, 10, and 7. Isabel is the sister of Felicia's (household 5) husband. Like Juana, her neighbor, Isabel never attended school and wears the traditional clothing worn by adult women. Her husband completed elementary school and all her school-age children are enrolled in elementary school; the eldest attends high school in Llaqta Ayllu.

The newly constructed main house is plastered and painted a pastel pink. They also own a house that is located on the road, next door to our living compound, and after disputes with his brothers, he built their current home on the pampa. They have retained the house for themselves and opened a store in it in 1986. Household members take turns attending the store and it is usually open during the morning and late afternoon and evening.

Isabel's husband spends several months each year in Maldonado and actively participates in the Ura Ayllu horn band. In 1986 he returned from the jungle ill and was

ambitiously seeking treatment throughout the dry season. Isabel was preparing several different kinds of home treatments while he was simultaneously making visits to the health post in Llaqta Ayllu as well as to a health promotor located in Puna Ayllu. He had still not recovered when I left the village in January 1987.

Household 13 Eufracina and her husband Jorge (both 40) have seven children, the youngest born in late December 1986. The eldest child, a daughter (age 18), is unmarried and spends much of her time working for others. Their teenage son (age 15) attends school but also works for families. The other children include two daughters, ages 11 and 4, and two sons, ages 7 and 2.

Eufracina is the sister of Isabel's husband Jaime (household 12). Their parents came to the district as workers for the road project. As a young girl, Eufracina worked for and was raised by the owner (patron) of the hacienda that was located in the Sollanque sector of Ura Ayllu. She married when she was quite young but, because of her origins, she did not bring much land into the marriage.

Eufracina's husband usually migrates to Maldonado during the rainy season to work in the goldfields. Jorge does not own a claim to land there but works as a wage laborer (peon) for others. Because his income is scanty, he decided against gold mining for the 1986-87 season. Rather, he remained in the village and migrated downvalley to work in the harvests of corn and coca.

This family falls at the lower end of the socioeconomic scale. They possess few material possessions and have irregular and apparently inadequate income sources. Eufracina spoke frequently and emotionally about the difficulty of raising a large family. It was my observation that life was quite precarious for this household.

Household 14 Guillerma (37) is the mother of seven children (another daughter died) and has recently been abandoned by her husband who has left the village and set up an independent household in the jungle. Neither Guillerma's in-laws nor her father are orignially from Ura Ayllu. Her mother is from Aripo and all Guillerma's landholdings come from her, and are located primarily in Aripo. Guillerma rents and sharecrops some lands in another community below Aripo.

She has five daughters (ages 18, 13, 6, 3, and 1) and two sons (16 and 9), the eldest of whom works primarily in the jungle. Guillerma and her children, especially the older ones, spend a great amount of time not only working on their own fields but selling their labor to others, both within the community and outside of it. When not working in the fields, Guillerma earns cash weaving for other women within Ura Ayllu. In November 1986, she sent her six-year old daughter to a family in Puno to work as a dometic aide. Guillerma is a active women, often absent from the community for days, but was always pleasant and willing to talk.

Household 15 Yolanda, 30, is originally from Azangaro and moved to Puna Ayllu with her father in the 1970s. Her husband Adolfo (35) is from Ura Ayllu. They have three children (her first, a male, was stillborn): a son, 6, and two daughters, ages 3 and 1. Yolanda has had no formal education and wears chola clothing. Her husband spends time in the montaña region and in Madre de Dios.

When I first met Yolanda, she was living in an uncle's house. During the dry season, June 1986, she and her husband built their own house on the outskirts of town. The house was built with ayni reciprocal labor but a permanent kitchen had yet to be constructed. During our last visit, the kitchen was a temporary lean-to construction with sheets of plastic used for walls. The change in Yolanda was notable once she was in her own house. She felt uncomfortable with "guests" when living in someone else's home and was usually stern and anxious in our presence. Her behavior totally changed once established in her new home. She was very frank about her discomfort with her previous living arrangements and appeared to much more at ease with visitors.

CHAPTER THREE

DIETARY AND ANTHROPOMETRIC ANALYSES

In this chapter I present the analyses of the food consumption and anthropometric data. I begin with a description of the composition of the Ura Ayllu diet and its seasonal dimensions. The discussion will then turn to children and will examine their caloric intakes in relation to energy requirements and what effects, if any, seasonality and socioeconomic status have on children's dietary patterns. This is followed by the analyses of the anthropometric data. The findings are discussed in Chapter 5.

Seasonal Variation in Energy Consumption

Composition of the Diet

As described in Chapter 2, the farmers of Ura Ayllu grow food for their own consumption. Surplus production is rare and when a household has a small surplus, it is generally exchanged with other households for different products (barter) or for cash (sale). Agricultural production, however, is only one source of food in the diet. Commercial foods purchased in the market also play a role.

The availability of food in a household is shaped, therefore, by a household's access to land and cash and it is expected that the Ura Ayllu diet reflects the seasonal nature of both agricultural and wage incomes.

In this section, I present an overview of the caloric composition of the Ura Ayllu diet at the three different measurement rounds. Using six composite food groupings, the analysis illustrates the seasonality of the diet. In the section that follows, I examine the energy intakes of children and discuss the nutritional (energy) consequences of seasonal dietary fluctuations for young children.

The Ura Ayllu diet exhibits seasonal variation in the sources of calories. Table 3.1 shows the seasonal changes in the relative importance of certain foods to total calorie intake. The six food categories are: 1) fresh tubers (e.g., potato, oca, illaco, and isaño); 2) processed tubers, which includes the traditional freeze-dried forms of potato (chuño) and oca (khaya) as well as the freshly-processed forms of potato, moraya and qanku; 3) animal products including cebo (tallow), eggs, and meat; 4) purchased grains and grain products (e.g., rice, barley, flour, pasta); 5) local grains (maize) and legumes (habas or broad beans); and 6) other foods among which sugar and vegetable oil figure most prominently in terms of calories.

The results of this analysis demonstrate the heavy reliance on fresh tubers throughout the year but especially in two seasons when tubers are most abundant (rounds one and

Table 3.1

Sources of Calories by Round

Food Groupings	Round 1	Round 2	Round 3
Fresh tubers	63%	46%	22%
Purchased grain products	16%	17%	39%
Local grains and legumes	3%	13%	14%
Processed tubers[a]	7%	11%	8%
Animal products	4%	5%	3%
Other	7%	9%	12%

[a] The processed tuber category includes freeze-dried tubers such as chuño and khaya, as well as the freshly processed forms, moraya and qanku.

two). In both these measurement rounds fresh tubers are by far the most important source of energy with purchased grains coming in second with about 16 percent. It is only in the third round, which represents the pre-harvest months, that foods other than tubers predominate. Overall, fresh tubers and purchased grain products (e.g., rice, noodles, flour, and bread) make the largest contribution to the diet, ranging from 79 percent in round one to 61 percent of all calories during round three. Thus, despite the variety of crops grown in Ura Ayllu, fresh tubers are the most important source of calories and when combined with purchased grains provide over 60 percent of total calories throughout the year.

The caloric contribution from each of the other food groups is less than 15 percent of the calories consumed at any point in the year. While its relative importance to the diet is less than tubers and purchased grains, local grain and legume consumption also refects seasonality. Maize and habas only contribute three percent of all calories in round one compared to 13 percent at the time of their harvest in round two. The continued importance of these foods in round three (14 percent of calories) may be due to how well they preserve and perhaps to their role in the diet as other foods, particularly tubers, become more scarce.

One of the more surprising findings of this analysis is the role of the traditionally-processed tubers in the Ura Ayllu diet. Previous research in the Andes has demonstrated

that these foods, which can be stored successfully for years, become more important to the diet during the pre-harvest season and in periods of food stress (e.g., Leonard 1987: 77). My research indicates, however, that the caloric contribution of processed tubers remains fairly constant across seasons, ranging from seven percent in round one to ten percent in round two. These foods play a different role in the Ura Ayllu diet and the difference may relate to the availability of cash and alternative food sources. While chuño and khaya continue to be prepared and consumed, some portion of them may be held in reserve to ensure household food security in the event of a bad harvest or when cash supplies are depleted.

Another possible explanation may relate to the quality of the previous harvests. According to informant reports, the 1984 and 1985 harvests of oca were disappointing (although the potato harvests were considered very productive). Even though people did not face crop failures, it is possible that lower oca yields affected the amount of khaya processed during these two agricultural years. It may be, then, that the lower-than-expected importance of processed tubers in the diet relates to decreased harvest yields of fresh oca.

Most of the foods cultivated in Ura Ayllu are not calorically dense. That is, these foods do not yield many calories per 100 grams of weight. This is particularly true for fresh foods such as potatoes, oca, beans, and corn for

which water contributes the greatest part of the weight. Dried beans and corn are more calorically dense (yielding, on average, about 328 kcal per 100 grams) but these foods are not eaten in large quantities and, as we see from Table 3.1, never contribute more than 14 percent of all calories consumed. The caloric contribution of purchased grains and grain products, which are more calorically dense than fresh foods, is greatest during round three, that is, during the pre-harvest months when local food supplies are diminished.

The heavier reliance on purchased grains in round three is reflected in the higher mean caloric density of the diet in that round. During the first two rounds the average caloric density of the diet is similar: 115 kcals for every 100 grams of food consumed in the first round and 118 in the second. The average density of the diet in round three is 200. The figures for preschool-age children (one through six years of age) are in line with those of the entire sample: 126 in round one, 135 in round two and 222 in round three. This is expected since everyone in a household eats from a common pot.

Energy Intakes of Young Children

In the following section I will present the analyses of children's caloric intakes. The first part describes the intake data during each round or season. The age groupings used in these analyses--one through three years and four through six years--were defined for the sake of

comparability with the nutrition standards (NRC 1989b; FAO/WHO/UNU 1985). These standards for recommended daily allowances do not differentiate between sexes for children ages one through nine years of age.

The debate on differential allocation of foods among yound children has focused on gender as a key factor in some societies. The first step in this analysis, therefore, is to determine whether there are statistically significant differences between boys and girls in caloric intake for each age group. Estimates of caloric intake--means and standard deviations--are provided for each age and sex group, by round, in Table 3.2. The results of the Student's t-test (t and alpha) appear in the last two columns.

Although Table 3.2 shows that one to three-year-old girls appear to consume more calories on average than their male counterparts during each of the measurement rounds, the differences are not statistically significant. The opposite trend is observed for the four to six-year olds, where boys' caloric intake appears to be greater than girls; however, the differences are not statistically significant in this age group either. According to these estimates of caloric intake, therefore, it does not appear that one sex is receiving significantly more food than the other and that the allocation of food is similar among boys and girls in these age groups. Thus, for the remainder of the analyses, boys and girls will be grouped together, following standard nutritional procedures. A comparison of mean daily caloric

Table 3.2

Comparison of Male and Female Children's Caloric Intake by Sex and Round

	Male		Female		Statistic[a]	
Age Group (years)	(n)	x ± s.d.	(n)	x ± s.d.	t	p
Round 1						
1 - 3	(7)	756 ± 193	(5)	788 ± 358	-.197	.848
4 - 6	(6)	1219 ± 338	(7)	1146 ± 468	.317	.757
Round 2						
1 - 3	(7)	416 ± 211	(5)	475 ± 289	-.409	.691
4 - 6	(7)	935 ± 514	(7)	797 ± 429	.549	.593
Round 3						
1 - 3	(7)	638 ± 233	(5)	760 ± 227	-.906	.386
4 - 6	(7)	1050 ± 488	(6)	934 ± 279	.513	.618
All Rounds						
1 - 3	(21)	604 + 248	(15)	674 + 310	-.760	.453
4 - 6	(20)	1061 + 450	(20)	960 + 413	.737	.466

[a] Student's t-test, two-tailed, pooled variances

intakes of children, adult women (females at least 20 years of age) and the entire sample is shown in Table 3.3.

In all three groups, caloric intakes decline from round one to round two and increase from round two to round three. In the entire sample (row 4), the difference in per capita intake between the harvest and post-harvest seasons--i.e., rounds one and two--is approximately 80 calories (1335 kcals in round one and 1254 kcals in round two). Per capita caloric intake increases by almost 100 calories, from 1254 to 1351 kcals, in round three. Women's intake also declines in round two but the absolute difference is less than 50 calories (1654 kcals in round one, 1610 kcals in round two). The absolute difference in caloric intake between rounds one and two is greater for children than for women or for the sample as a whole: 328 kcal for children ages one to three; 313 kcal for children ages four to six. Moreover, the relative (percent) differences between rounds is greatest for the toddlers (55%) and pre-schoolers (31%) than for adult women (3%) and the sample as a whole (6%).

One-way analyses of variance were conducted on energy intake by season in both groups of children. The results show statistically significant differences in calorie intake by round for the toddler group ($F = 6.013$, $p = .006$). Energy consumption among four to six-year olds, however, does not differ significantly by round ($F = 1.882$, $p = .167$). Women's intake varies little between rounds, with

Table 3.3

Comparison of Mean Caloric Intakes by Round

	mean caloric intake kcals ± s.d.		
Group	Round 1	Round 2	Round 3
Children			
1-3 years	769 ± 259	441 ± 235	689 ± 229
(N)	(12)	(12)	(12)
4-6 years	1179 ± 398	866 ± 461	997 ± 394
(N)	(13)	(14)	(13)
Adult Women*	1654 ± 427	1610 ± 603	1653 ± 483
(N)	(16)	(16)	(16)
Entire sample#	1335 ± 575	1254 ± 675	1351 ± 599
(N)	(57)	(75)	(75)

* Includes all adult women (≥ 20 years of age). The n represents fifteen mothers and one mother-in-law with whom one mother and her family resides.

The mean age of the sample is 14 years in round one and 16 years in rounds two and three.

pre-harvest (round three) values being almost identical to those of round one.

The data presented in Table 3.3 thus illustrate significant annual fluctuations in the caloric intakes among toddlers. The pattern that emerges--higher intakes during rounds one and three and a decline during round two--is not the pattern that was expected. Since the measurement rounds were structured around the agricultural cycle (rounds one and two representing the harvest and post-harvest periods and round three representing the pre-harvest season), it was anticipated that intakes would be highest during the first two rounds than during the pre-harvest round three. The data illustrate that this is not the case. Caloric intakes are lowest, and in the case of the toddlers (ages one to three) extremely low, during the time of the year when harvests are complete and food is most abundant. How, then, do we explain this apparent discrepancy?

To determine whether my definition of seasons (rounds) is valid (or whether it obscures more short-term variation), caloric intakes of adult women and young children (1-3 and 4-6 years) were calculated on a bi-monthly basis. The results of this analysis are shown in Table 3.4. The data in Table 3.4 suggest that the seasons already defined according to the agricultural cycle seem to represent the data accurately. Children's caloric intakes, whether observed bi-monthly or by round, exhibit a pattern of decline that parallels the availability of food during the

Table 3.4

Bi-monthly Mean Caloric Intakes

Group	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Nov-Dec
1 - 3 years	700	865	473	351	674
(N)	(4)	(8)	(9)	(4)	(11)
4 - 6 years	1306	1145	929	820	994
(N)	(2)	(11)	(6)	(8)	(13)
Adult Women	1890	1624	1423	1820	1611
(N)	(5)	(11)	(10)	(8)	(14)

harvest and post-harvest periods. With the exception of an increase (approximately 160 kcals) among one- to three-year olds in March and April, children and women have declining intakes during the first six months of the year. For children the decline continues through August, while during the same period (July-Aug) women's intake increases. By November and December, the pre-harvest months, children's intakes increase as women's declines. Thus, the partitioning of the year into seasonal rounds does appear to characterize adequately annual variation in childrens's consumption patterns.

Adequacy of Children's Diets

Having examined the data on two different time scales, the fact remains that children's caloric intake declines and falls to its lowest level during post-harvest season, that is, at the time of year when such declines are unexpected. This section examines the caloric adequacy of children's diets during each of the three agricultural seasons.

There is a debate in international nutrition as to which standards are most appropriate for assessing the adequacy of diets in less-developed countries. In these contexts, body weights tend to be smaller for age and activity patterns may be very different from those in more-developed countries (Leslie et al. 1984; NRC 1986; Pellett 1987). This study compares children's energy intakes to caloric requirements calculated by Leslie, Bindon, and Baker

(1984) for non-Western populations. These authors propose a model for predicting energy requirements that takes into account anthropometric, demographic, and environmental variables in addition to activity patterns (ibid.). The model was tested on four different populations, including Nuñoa, an Andean community also located in the Department of Puno.

In this study, I use the predicted energy requirements as recalculated (for age groups 1 to 3 and 4 to 6 years) by Leonard (1988a) for Nuñoa. These estimated requirements are more applicable to the population under study than are the recommended allowances provided by the NRC and FAO/WHO/UNU because they reflect the specificities of Andean activity patterns, demographic structure (age-sex distribution) and environment. See Table 3.5 for a comparison of the FAO/WHO/UNU and Leslie Model values of estimated caloric requirements for young children.

The Leslie Model calculates the resting metabolic rate with the mean weight (kg) of individuals within each age-sex group (Leonard 1988a:343). A comparison of children's body weights from the present study with those from Leonard shows that body weights are slightly higher in the Ura Ayllu sample for the youngest children (11.6 kg in Ura Ayllu vs. 10.3 in Nuñoa) and identical body weight averages for the four to six-age group (16.6 kg). Therefore, the predicted energy requirements will be slightly higher in the youngest group for Ura Ayllu. However, because mean daytime

Table 3.5

Estimated Caloric Requirements for Young Children
Comparison of the FAO/WHO/UNU and Leslie Model[a]

Age Group	FAO/WHO/UNU[b]	Leslie Model[c]
1 - 3 years	1300	673
4 - 6 years	1700	910

[a] Leslie et al. 1984
[b] FAO/WHO/UNU 1985:94-95.
[c] Estimates for these age groups calculated by Leonard (1988a) using the Leslie Model

temperature is calculated into the model, and Nunoa is higher and colder than Ura Ayllu, it can also be assumed that the energy needs in Ura Ayllu may be slightly lower than those calculated for Nuñoa. Overall, the model as generated for Nuñoa should be a good fit to the Ura Ayllu situation since the similarities between the two communities far outweigh any of the differences.

This comparison of the observed energy intakes and the predicted calorie requirements is shown in Table 3.6. Overall, we see that the caloric intakes are in line with the predicted requirements. During round two, however, the caloric adequacy of the toddler diet declines to 65.5% of predicted requirement. The decline in caloric intakes among pre-schoolers (four to six) is much less (to 95%). During the first and third rounds, observed caloric intakes exceed the required levels for both groups of children. This finding suggests that children are meeting their energy needs in these seasons. The data also indicate that women's intakes never exceed the predicted energy needs at any time of the year; thus their intakes are somewhat less adequate than those of young children (with the exception of toddlers in round two).

Food Allocation

In this section, I discuss intra-household food allocation. As suggested by Abdullah and Wheeler (1985), energy intakes expressed as a proportion of male household

Table 3.6

Comparison of Observed Energy Intakes to Predicted Energy Requirements of Young Children and Adult Women

		Predicted	Observed, by Round		
			kcal (% of Total)		
Age	Sex	Total[a]	1	2	3
1 - 3	M-F	673	769 (114%)	441 (65.5%)	689 (102%)
4 - 6	M-F	910	1179 (130%)	866 (95%)	997 (110%)
Adults	F	1798[b]	1654 (92%)	1610 (89%)	1653 (92%)

[a] Total predicted energy requirement is the sum of the resting metabolic rate and amount of energy expended in daily activities.
[b] Total includes energy costs of pregnancy and lactation.

heads provide an indicator of food allocation within the household. In this study, I follow the procedure used by Leonard (1987), expressing children's energy intakes as a percentage of mother's intakes, since males were often absent from the community, and, thus, do not provide a reliable comparison. The results are shown in Table 3.7.

In this table we see that children's intakes relative to mothers' intakes vary over the three measurement rounds. For both toddlers and preschoolers, relative intakes were highest during the first round and lowest in the second round. Since women's energy intakes remain relatively steady throughout the year while children's intakes decline during the second round and then rise again during the pre-harvest round (three), this is expected.

What is clear, however, is that children's energy intakes represent a significant proportion relative to women's. It is estimated that by the age of six, children are consuming a similar amount of energy as their mothers (Wheeler and Abdullah 1988).

Discussion

The enigma of lower energy intakes during the post-harvest months relative to the pre-harvest months requires further discussion. During the period encompassed by round two (May, June, July and the first week of August), the Ura Ayllinos are finishing up the harvests of corn and habas (May and June) in the lower-lying fields. The climate is

Table 3.7

Child's Energy Intakes Relative to Mother's

Age Group	Round 1	Round 2	Round 3
		(kcal intake as percent)	
1 - 3 years	50%	28%	46%
4 - 6 years	76%	52%	68%

dry and clear and the men and boys have returned to the community from Maldonado as the lack of rain makes mining impossible during this time of year. Ura Ayllu is bustling with activity as people prepare the fields for the next planting, stock up on cooking fuels gathered down valley, and make home repairs. People take advantage of the clear weather and newly replenished labor force and work long days, often a distance from the home.

The populuation of Ura Ayllu fluctuates over the course of the year. For the sample in this study, household size changes by round; the number of individuals present in round one (N=57) increases during rounds two and three (N=75). That is, during round one 61% of all household members are present; during rounds two and three that percentage increases to 81 percent. While it may first appear that the returning household members ("productive") are siphoning off food to themselves at the sake of the young children ("unproductive"), this pattern does not hold for round three. While the same number of individuals are present during the second and third rounds, children's intake increases during round three. Thus it does not appear that household size affects the caloric intake of children. It should be remembered that while the return of migrants might put extra stress on the family food supply, it would not be expected during this point of the annual cycle when food and cash to purchase foods are at their highest levels.

Seasonal changes in household size and activity patterns may not directly affect food intake but they may affect consumption patterns such as the number of meals eaten per day. Table 3.8 shows the number of meals (meals per child) observed and the number of these meals where the child was present. While the number of meals observed increases slightly in round two, most of this increase can be attributed to the small increase in the size of the sample during this period. Comparing the number of meals observed in rounds one and three, when sample sizes are the same, we see that more meals were prepared and consumed by these children in round three. Although more meals are consumed by children at this time, their caloric intake is less than in round one.

The data presented in Table 3.8 show that childrens's low caloric intakes in round two do not result from fewer daily meals. Although the data do indicate that more children are absent from meals in round two (8%) than in the other rounds (2% in round one; 3% in round three), the difference is not large enough to explain the large decline in caloric intake during the second round. Furthermore, although not present for meals prepared at their homes, the absent children, were often in the care of other people, usually an aunt or grandmother who would feed the children at their homes. Thus, it is possible the busier work schedules at this time of the year require women to look to

Table 3.8

Comparison of Meals by Round

Criteria	Round 1	Round 2	Round 3
No. of Children	25	26	25
No. Meals Observed	62	66	70
No. Meals Present	61	61	68
Percent Meals Present/ Meals Observed	98%	92%	97%

others for child care during the day. Children who are cared for by other women may also have access to food.

Children who fall asleep before a meal is served, although not counted as absent, may also contribute to lower intakes, but they do not account for the bulk of the decline. In round two, three of the 12 toddlers fell asleep during a meal; however, in only one of these cases does the daily caloric intake vary considerably from that of the mean. Removal of this case from calculation yields only a 30 kcal difference in the mean daily caloric intake of toddlers, hence this case remains in the sample and cannot account for much of the seasonal variation.

To summarize the analysis up to this point, from the evidence presented here--number of meals consumed per round and caloric density of the diet per round--we are not able to explain why children's caloric intakes drop so precipitously during the post-harvest season when intakes of other segments of the sample remain steady. The number of meals prepared per round are similar and children are eating almost as frequently as in the other rounds. While the composition of the diet changes from round to round, the caloric density changes only slightly from round one (120 kcal/100 grams) to round two (135 kcal/100 grams). It does not appear, therefore, that children are eating foods that provide less energy; it appears quite simply that children are just eating less. And, in the case of the youngest children, calories are not just lower than the previous

round, but are very low in terms of energy needs. Moreover, we see this pattern exactly at the time of year when it is least expected, during the post-harvest time.

Qualitative information gathered through observation and conversation suggests another potential explanation for the low caloric intakes of children during the second round. As described above, this period is one of activity and work. As we have seen, however, the work patterns are not reflected in the number of meals prepared. That is, people do not appear to be skimping on meals in order to accomplish certain tasks. Ethnographic data suggest that while number of meals may be similar, the incidence of snacking between meals is greater during this post-harvest period, especially for young children. Local foods appropriate for eating between meals--i.e., tubers--are deliberately cooked and left by mothers for children to eat whenever they desire. Bread and fruit, which are purchased, are also readily available at this time. Thus, it is possible that children's food intake between meals is significant and may, in fact, affect the amount of food eaten during meals. If a child knows there is food for snacking, she may not eat as much during the meal. Likewise, if children eat throughout the day, their appetites at meals may be less than if food was unavailable between meals. The issue of snacking is addressed in more detail in Chapter 4.

Analyses (SAS CATMOD [logistic regression; maximum likelihood estimate] statistic) of the PSE time allocation

data also indicate that young children (2-6 years) spend significantly greater amounts of time eating than do adults ($p = 0.0005$). Research by Garcia, Kaiser and Dewey (1990a,b) in rural Mexico indicates the importance of between meal snacking to daily energy intake among 45 young children (ages 33-60 months). The authors found that children ate, on average, 7.4 snacks per day, yielding 45 percent of total daily calories. This research in Mexico indicates that young children are consuming significant amounts of food throughout the day and suggests that energy intakes obtained only during meals may be greatly underestimated.

Seasonality and Socioeconomic Status

Estimating Wealth

To determine the effect of economic status on food consumption and the possible interrelationship between economic status and seasonality, the sample was divided into three economic stata. By most standards, Ura Ayllu is a poor community. Houses are rustic and furnishings are simple, consisting of a few beds, tables, and chairs. There is no electricity. Its remoteness in an impoverished Department (and country) contributes to its negligence in state-supported services and infrastructural improvements. It is the general contention of the comuneros that the police and school teachers who are sent to the area are poorly trained and are serving "punishment" terms for

previous infractions. Thus, people are cognizant of the position of the community within the country and refer to the region as "el rincón olvidado del Peru" (the forgotten corner of Peru).

Despite its overall poverty, there is economic stratification within the community and the comuneros are aware of this differentiation. As several informants pointedly instructed us at the beginning of our research: "No somos iguales" (we are not equal). Wealth is recognized largely by the amount and kinds of agricultural lands possessed by a household. Land alone, however, is insufficient to define wealth in the community. Cash income, and fairly reliable sources of it, plays an important role in the definiton of wealth. One may be land rich and cash poor or land poor and cash rich but neither is considered an economic optimum. Thus, wealth in the community is defined by a balance of land and cash resources that are sufficient for meeting household and community responsibilities.

Estimating the wealth of peasant households is a difficult task for several reasons. First, commonly-used estimates of economic status -- land and animal holdings and cash income from wage labor -- may be difficult to obtain or unreliable. People are often hesitant to reveal the intimate details of household economy with sufficient accuracy for analytic needs. In the present case, some people were suspicious of our intentions even after our

long-term acquaintance and reassurances of confidentiality. Furthermore, economic information obtained from censuses may also contain inaccuracies depending upon the end to which the data are used (e.g., taxation).

Two, cash incomes, in particular, are difficult to estimate in rural communities like Ura Ayllu because very few individuals earn a regular income. Full-time wage employment is extremely rare among Ura Aylliños. The more typical pattern of wage labor is seasonally based where small amounts of money come in from a number of different sources. The most regular source of cash in Ura Ayllu is earned in gold mining activities. This too is seasonal (dependent upon rainfall) and the earnings are erratic, depending upon the amount of gold found. Thus, it is difficult for both the researcher and the informants to supply income information when its sources are varied and erratic.

For the purposes of this study, a scale of relative wealth is used to partition the sample into three economic strata. Late in the study, my assistant and I rated the households along a scale of relative wealth based on our observations of material possessions and housing quality, and on our general understanding of the economic status of the household (e.g., land and animal holdings, and sources of income) obtained through discussions and observation. I prepared two different lists of the sample households that were divided into overlapping groups of four and one group

of five.[1] Each grouping was treated independently and households were rated from less wealthy (1) to more wealthy (4 or 5). The numeric ranks for each household were then averaged to obtain the final scale score.

This relative ranking of households yielded three economic strata. Four households (ranked from 1.0 to 1.99) were included the lower economic stratum (I); five households in the second (II) stratum (2.0 to 2.9); and six households in the higher stratum (III) with scores from 3.0 to 4.0.

The next step of the analysis was to determine whether the ranking correlated with other measures of wealth. Given the difficulties of estimating cash incomes in the community, an index was constructed from data based on household possessions. This may be considered an indirect measure of income in the sense that these material possessions represent cash expenditures. Points were assigned for the presence of seven items: radio (1 point), sewing machine, bicycle (2 points each), kerosene lamp, kerosene stove (3 points each), tricicleta (4 points) and truck (5 points). If a household possessed multiples of an item, it was scored accordingly. The mean household material possessions score is 13 points (range 1 to 27 points).

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[1] Seventeen families were included in the ranking. Two households were omitted for the analyses in this study.

A Spearman rank correlation test was conducted to examine the extent of agreement between the relative wealth ranking and the material possessions scores. The test yielded a statistically significant correlation between the two rankings ($r = .547$, $P = .05$, $n=15$). Thus, the relative wealth ranking is significantly correlated with the more mensurate measure of material possessions.

The significant correlation between the wealth ranking and material possessions score may reflect the raters' focus on the material manifestations of wealth when ranking the households, but it does not describe the totality of wealth. Although the wealth ranking is not significantly correlated to total amounts of household agricultural lands (obtained from census records), it does correlate well with husband's education ($r = .643$, $P = .05$, $n=12$).[2] The association between the ranking and husband's education may relate to the fact that those men with more education tend to be younger and more actively involved in gold mining. Thus, the relative ranking appears to be sensitive to a household's material wealth and cash earning possibilities.

Dietary Composition by Round and Socioeconomic Status

Table 3.9 shows household diet composition broken down by round and socioeconomic status (SES). The first two rounds have little systematic variation between the economic

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[2] Two households are female-headed with no husband present and one husband's education was not indicated.

Table 3.9

Diet Composition by Round and Socioeconomic Status

Criteria	SES I (n=4)	SES II (n=5)	SES III (n=6)
Round One			
Per capita kcal	1482	1210	1283
% Fresh tubers	65	66	61
% Proc. tubers	10	4	9
% Animal	1	3	6
% Purchased grains	11	18	17
% Local grain	6	3	2
% Other	8	7	7
Round Two			
Per capita kcal	1308	1242	1211
% Fresh tubers	48	49	42
% Proc. tubers	10	12	11
% Animal	3	3	8
% Purchased grains	13	16	20
% Local grain	20	10	10
% Other	7	10	9
Round Three			
Per capita kcal[a]	1082	1353	1573
% Fresh tubers	21	31	16
% Proc. tubers	9	8	9
% Animal	4	3	3
% Purchased grains	44	29	44
% Local grain	13	13	15
% Other	8	16	13

[a] Differences in caloric intake by SES are statistically significant in Round Three only (ANOVA, $F = 5.082$, $p = 0.009$).

groups. The relative importance of the different food groups are similar between socioeconomic strata and per capita intakes, by household, indicate that those households in the low SES group are consuming slightly more calories than households in the higher groups. Commercial grains are less important in the lower SES diet than in the higher groups during rounds one and two but the difference is not statistically significant.

It is only in the round three that we observe a statistically significant difference in caloric intakes by economic status: there is a 200-300 kcal increase with each SES group. Purchased grain products are now the most important source of calories for both the lowest and highest SES groups, although the caloric intakes vary. This may indicate that while households become more dependent on market foods in round 3, those in the higher SES are better able to purchase the amounts they need than those in the lower SES.

Children's Caloric Intake by Round and Socioeconomic Status

In the following section, I present data on children's caloric intake broken down by SES and season (see Table 3.10). During round one, energy consumption among all children is close to or exceeds energy requirements. During round two, the pre-schoolers fare better than toddlers but there is no significant correlation of SES and caloric intake for either age groups. Caloric intakes of pre-

Table 3.10

Mean Energy Intakes by Round and Socioeconomic Status

SES Strata	Round 1	Round 2 (kcal ± s.d.)	Round 3
1 - 3 year olds			
SES I	658 ± 177	497 ± 143	668 ± 278
% of req.	98%	74%	99%
(n)	(4)	(4)	(4)
SES II	813 ± 406	448 ± 169	815 ± 257
% of req.	121%	67%	121%
(n)	(4)	(4)	(4)
SES III	837 ± 158	379 ± 381	583 ± 109
% of req.	124%	56%	87%
(n)	(4)	(4)	(4)
4 - 6 year olds			
SES I	1159 ± 178	873 ± 511	868 ± 278*
% of req.	127%	96%	95%
(n)	(4)	(4)	(4)
SES II	1054 ± 297	704 ± 323	642 ± 165
% of req.	116%	77%	71%
(n)	(4)	(4)	(3)
SES III	1296 ± 593	970 ± 546	1260 ± 379
% of req.	142%	107%	138%
(n)	(5)	(6)	(6)
Adult Women			
SES I	1821 ± 532	1600 ± 310	1489 ± 857
% of req.	101%	89%	83%
(n)	(4)	(4)	(4)
SES II	1459 ± 389	1789 ± 831	1852 ± 239
% of req.	81%	99%	103%
(n)	(6)	(6)	(6)
SES III	1736 ± 388	1438 ± 519	1564 ± 354
% of req.	96%	80%	87%
(n)	(6)	(6)	(6)

*Spearman rank correlation of SES and caloric intake are statistically significant in 4 - 6 year olds in round three only ($r^s = .576$, $p \leq .05$, $n = 13$).

schoolers in the third round are correlated significantly with SES, although SES II intake is less adequate (71% of requirement) than the intake of SES I (95%). For toddlers, the energy intakes in the two lower SES groups appear to be more satisfactory (99% and 121%) than those of children in the high SES group (87%). Since the sample size in each of the cells is quite small, caution is needed when interpreting these results.

Reviewing the per capita intakes in Table 3.9 we see a pattern of increasing intakes with economic status. This pattern does not hold for toddlers. It appears that even though overall intakes are lower for the SES I group during round three than in round one, toddler energy consumption remains steady and adequate, despite changes in the kinds of foods eaten. This may indicate that mothers are buffering children from seasonal food shortage.

Anthropometric Analyses

Dietary data are only one source of information used to assess the nutritional status of an individual or a population. Anthropometric measures are better indicators of nutritional status than are dietary data alone since anthropometrics are sensitive to both short- and long-term environmental processes (e.g., acute vs chronic malnutrition) that affect growth and development and ultimately the nutritional and health status of an individual. Growth and development are influenced by a

number of factors in addition to diet--disease, environment, and heredity. The section that follows provides the analyses of the anthropometric data (body weight and stature) collected on the children in this study.

For this analysis, the mid-year average height (cm) and weight (kg) were calculated for each child and were then converted to standardized scores (Z-scores) according to the age- and sex-specific standards (means and standard deviations) provided in Frisancho (1990). Standardized (Z) scores "maximize the diagnostic effectiveness of anthropometric information" (Frisancho 1990:31) and permit comparison between age and sex groups. Anthropometric measures are compared to standards to the recent anthropometric classification proposed by Frisancho (1990)[3] and uses both Z-scores and percentile cutoffs. The classification scheme proposed by Frisancho is presented in Table 3.11.

Tables 3.12 and 3.13 show the average body weights, statures and Z-scores for boys and girls in each of the age groups. The Z-scores below reflect the average score for children in each of the age groups. Student's t-tests were employed to test for significant differences between the sexes. The results of the test are indicated in the last

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[3] Frisancho's 1990 publication, Anthropometric Standards for the Assessment of Growth and Nutritional Status, is based on a cross-sectional sample of 44,130 individuals aged 1 to 74 years derived from the first and second National Health and Nutrition Examination Surveys (NHANES I and II) of 1971-74 and 1976-80 (Frisancho 1990: 9).

Table 3.11

Frisancho's Anthropometric Classification

Category	Percentile	Z-score	Growth Status	Weight Status
I	0.0 to 5.0	Z < -1.650	Short	Low Weight
II	5.1 to 15.0	-1.645 to -1.040	Below Average	Below Average
III	15.1 to 85.0	-1.036 to +1.030	Average	Average
IV	85.1 to 95.0	+1.036 to +1.640	Above Average	Above Average
V	95.1 to 100	Z > +1.645	Tall	Heavy Wt.

Source: Frisancho 1990: 33

Table 3.12

Mean Body Weight by Sex

	Weight (kg)				Statistic	
Age Group	(n)	Male	(n)	Female	t	p
1 - 3 years						
Mean	(7)	11.35	(5)	12.01	-.972	.354
s.d.		0.889		1.462		
Z-score		-1.286		-1.478		
4 - 6 years						
Mean	(7)	16.725	(7)	16.438	.256	.802
s.d.		1.839		2.318		
Z-score		-1.180		-1.042		

Table 3.13

Mean Stature by Sex

	Height (cm)				Statistic	
Age Group	(n)	Male	(n)	Female	t	p
1 - 3 years						
Mean	(7)	78.921	(5)	83.901	-1.673	.125
s.d.		4.15		6.23		
Z-score		-2.771		-2.688		
4 - 6 years						
Mean	(7)	102.163	(7)	98.632	.884	.394
s.d.		6.482		8.343		
Z-score		-2.148		-2.322		

column and indicate no significant differences between male and females in either age group. Table 3.14 summarizes the data in Tables 3.12 and 3.13 with the boys and girls grouped together.

The above tables indicate that the stature of children falls lower in the percentile rankings than does body weight. The average Z-score for stature falls below the 5th percentile (Category I) among toddlers (Z= -2.7) and among preschoolers (Z= -2.2). Weight Z-scores are slightly higher than stature but still fall between the 5th to 15th percentile (i.e. Category II) for toddlers (Z = -1.4) and preschoolers (Z = -1.11). According to Frisancho's classification, it can be inferred that these children are short, and perhaps wasted, given their low Z-scores and grouping in Category I and are below average weight-for-age. Thus, it appears that children in this community are quite short for their age by the time they are two years of age. However, the small stature may be less a result of nutritional deficits than of other factors such as genetics and hypoxia, both of which have been identified as contributing to small stature among Andean populations (see Chapter 5 for more discussion).

As stated previously, the standardization of body weight and stature data into Z-scores permits comparison between groups. The anthropometric data presented in Tables 3.15 and 3.16 illustrate that the children in each SES grouping fall at least one standard deviation below the mean

Table 3.14

Mean Body Weight, Stature, and Z-scores of Children

Age Group	Weight (kg)	Z-Score	Height (cm)	Z-Score
1 - 3 years				
Mean	11.63	-1.37	81.0	-2.736
S.D.	1.15	0.487	5.49	0.881
N=12				
4 - 6 years				
Mean	16.58	-1.11	100.4	-2.235
S.D.	2.02	0.47	7.41	0.87
N=14				

Table 3.15

Mean Body Weights and Z-scores by Age Group and Socioeconomic Status

Age Group	n	Weight (kg)	Z-Score
1 - 3 years*			
SES I	4	11.44	-1.21
SES II	4	11.33	-1.58
SES III	4	12.11	-1.31
4 - 6 years*			
SES I	4	15.37	-1.23
SES II	4	16.75	-1.07
SES III	6	17.28	-1.06

* Spearman rank correlation coefficients of SES and weight are not statistically significant.

Table 3.16

Mean Stature and Z-scores by Age Group and Socioeconomic Status

Age Group	n	Height (cm)	Z-Score
1 - 3 years*			
SES I	4	77.62	-2.98
SES II	4	80.71	-2.89
SES III	4	84.66	-2.35
4 - 6 years			
SES I	4	96.97	-2.36
SES II	4	101.58	-2.08
SES III	6	101.89	-2.25

*Spearman rank correlations of SES and height are statistically significant in 1-to-3-year olds only. Spearman $r_s = .532$, $p \leq .05$, $n = 12$.

for their age and sex. In the case of body weight, Z-scores for each SES group lie between the 5th and 15th percentile. In the case of stature (Table 3.16), Z-scores are very low, falling well below the 5th percentile.

Statistical analysis shows that the relationship between socioeconomic status and height is significant in the youngest age group. The lack of correspondence between body size (weight and stature) and socioeconomic status in the 4-to-6 age group may have several explanations. One, the socioeconomic ranking may not adequately reflect the kind of wealth that influences longer term growth processes. Two, variation in wealth may not be great enough to yield significant differences in dietary strategies that in turn influence nutritional status. And, three, the incidence of infectious diseases, like diarrhea, that affect growth may be greater among younger children in poor households.

CHAPTER FOUR

CHILD FEEDING PRACTICES AND THEIR RELATIONSHIP TO MALNUTRITION AND HUNGER

This chapter is divided into three sections. The first section explores the issue of hunger in regard to young children. It examines the ways in which hunger is conceptualized in Ura Ayllu and how the ideology of hunger influences child care and feeding practices. The second section describes aspects of the Ura Ayllu foodway.[1] In this part, I look specifically at the structure and practice of cooking and eating. The last section focuses on the experience of seasonal hunger. It examines the ways in which a seasonal "crisis" is created and analyzes its consequences for children and women.

Children and the Experience of Hunger

Hunger is defined in a nutrition textbook as "an innate, often unpleasant sensation that one experiences when there is a physiological need for food" (Williams and Caliendo 1984:232).[2] Hunger is not an unusual experience to Ura Aylliños. Whether discussing acute periods of food

[1] Foodways, as defined by Ritenbaugh (1978:111), refers to "the behaviors that affect what people eat." It includes all aspects of consumption, production, and distribution.
[2] Contrast with appetite, "a learned desire for food even when one isn't hungry in a physiological sense" (ibid.).

scarcity associated with famine or large-scale crop losses or more transitory absences of food, people talk about hunger and have various ways of discussing it, including concrete and metaphoric discourse.

While hunger is generally an experience to be avoided, it is not considered rare or without its own sense of value. For example, withstanding the pangs of hunger is considered by some adults to be spiritually rewarding and a sign of stength and physical endurance. Ura Aylliños easily recall past agricultural crises that forced them to search for wild foods or eat unusual items[3] to combat hunger. In a more day-to-day context, hunger is frequently used in the discourse surrounding coca chewing, an integral part of life among native Andean people (Allen 1981, 1988), including the Cuyo Cuyeños. Coca chewers here and throughout the Andes claim that coca is an essential aspect of work because it reduces the sensations of fatigue, cold, thirst, and hunger while increasing vigor and strength (Plowman 1986).[4] In Ura Ayllu, people often begin and end the workday with coca and take breaks during the day to chew the leaf and rest.[5]

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[3] One elderly man living in Puna Ayllu recalls a time when agricultural production was destroyed and people resorted to eating the stiff raw hides used as door coverings.

[4] The energetic value of coca is insignificant (Duke et al. 1975).

[5] Not all Ura Aylliños chew coca. Those belonging to the Adventist Church abstain from both coca and alcohol. Some people refuse to enter into reciprocal labor arrangements (ayni) with Adventists because they believe the Adventists tire easily and require more food than others.

Feeding and hunger are prevalent metaphors in Andean cosmology and ritual. Maintenance of the intimate and reciprocal relationship between humans and spirits and the living and the dead is symbolized in the "payment" or "feeding" of the "hungry" spirits and enacted in rituals through the force-feeding of food, drink, and coca (Allen 1981, 1982). Participants who overcomsume these products pass on the special nourishment to the object of the ritual (Allen 1982:190).

Hunger is seen as a normal yet unpleasant experience. In Ura Ayllu, the avoidance of hunger forms the basis of a cultural logic which guides the feeding of young children, up to about six years of age. Infancy and young childhood are seen as an extremely vulnerable phase of life.[6] According to Larme (1990:6), "integration of body and soul is intrinsic to health, and the strength of the body-soul connection is thought to vary over the course of a lifetime." Infants are particularly susceptible to illnesses (such as uraña [Sp., susto or fright sickness],[7] wayra [Sp., aire, or sicknesses caused by drafts of cold air or wind]) because they are thought to have a loose connection between body and soul (ibid.). Like wind and sudden shocks, hunger may also make a child susceptible to

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[6] Evidence of the reality underlying this perception can be seen in the high infant mortality rates shown in Chapter 1.

[7] One of the four fright-related illnesses in Cuyo Cuyo and the principal fright sickness affecting infants and small children. Symptoms include crying, restlessness, diarrhea, and anorexia in children (Larme 1990).

illness and may threaten the tenuous bond between body and soul necessary to health and life. Many of the child care practices during this phase of life, discussed below, are intended to shield the infant from the agents which cause illness and hunger.

Nurturance and indulgance are two aspects of Ura Aylleño childcare practices but they are not necessarily the overtly material expressions seen in Western, middle-class culture. Nurturance in Ura Ayllu has a more pragmatic sense; it involves the provision of food, shelter, and clothing with an eye toward the child's survival, and its manifestations are more subtle. The household is not organized around children but there is a focus on them including formal rituals that recognize them as individuals and as members of a household and the community.[8]

Nurturance and indulgence are also seen in the ways women feed children. In contrast to adults and older children, young children should be shielded from the feelings of hunger and efforts are made to minimize their exposure to hunger. Hunger produces in children symptoms of illness--irritability, lethargy, and, in extreme cases, anorexia. These symptoms may interfere with food consumption and may ultimately make a child more susceptible to illnesses like diarrhea. Young children are considered too young to comprehend the fluctuating nature of food availability and unable to cope with the pangs of hunger

[8] Described in Chapter 2.

that may occur at certain times of the year or even between meals. Mothers try to compensate, as best they can, to alleviate or avoid sensations of hunger in their young children.

Women differentiate between the dietary needs of young children and older children and believe that these needs can be satisfied in different ways. Young children are considered incapable of eating sufficient amounts of food in one meal and therefore need to eat frequently. Thus, mothers make food available to them for snacking throughout the day. This pattern of eating differs from the typical meal structure of two or three meals per day which is considered adequate for older children and adults.

The ways women think about hunger, thus, have an impact on how they care for and feed their children. The following section will examine child care and feeding during infancy and toddlerhood in Ura Ayllu.

Child Care and Feeding during Infancy

Immediately after birth the baby is rinsed quickly, to avoid exposure to cold air, and wrapped in clean cloths. Prior to breastfeeding, a sweetened herbal or spice tea is administered to the infant.[9] The tea is thought to clear and prepare the infant's stomach for breast milk and to ensure that the child has a healthy stomach throughout its

[9] Women's post-partum diet restricts the consumption of misti mikuy (white foods) such as rice, pasta, flour, salt, and onions (see Chapter 2.). Oca is considered appropriate food because it is thought to promote milk production.

life. Colostrum (the "first milk") is usually expressed and thrown away as it is considered harmful to the infant.[10] Most women reported that its unusual yellow color and watery consistency, as well as the fact that it is considered stale, having been stored in the breast throughout the pregnancy, made it unhealthy for the newborn.[11] It is unclear exactly how long women delay breastfeeding after birth.[12] Once breastfeeding begins, however, breast milk remains the sole source of nourishment for the first several months of life.

Infants are kept close to their mothers and spend most of the day attached to their mother's bodies. Babies are swaddled tightly with several layers of cloth that are held in place with the hand-woven belts (the same as worn by women). After wrapping the baby, the belt is criss-crossed over the body and knotted and a knitted hat is placed on the head. The only exposed part of the baby's body is the face.

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[10] Some of the women in the sample reported that they had fed colostrum to their infants.

[11] According to Bastien's analysis of Andean medicine and body concepts, milk is considered a secondary fluid, produced in the heart during the distillation of air, blood, fat, and water. If accumulated, milk (like semen and bile) is thought to become toxic and must be purged (Bastien 1987:67).

[12] Vitzthum's study of infant feeding in Nuñoa shows that the majority of women (78%) in her survey sample (N=27) initiated breastfeeding within 24 hours after birth; the remaining women began nursing between 24 and 48 hours (Vitzthum 1988). Vitzthum concludes that despite the post-partum restriction on feeding first milk, infants do receive a substantial intake of colostrum and thus are conferred with the immunological properties contained therein (ibid.).

Infants are carried within the lliclla[13] on their mother's backs. Enclosed within the llicla, the infant lies sideways across the mother's back with the head slightly raised; the presence of an infant is discernible only by its distinctive oblong form. After several months, as the infant grows and gains more control of his or her body, the tight swaddling is removed and replaced with layers of sweaters and woolen skirts. The body is loosely wrapped with cloths which allows more freedom to move. The infants are no longer submerged in the llicla but are carried higher up on the back. They are placed vertically on the mother's back so the child can look over her shoulder as she works. The baby can also sleep in this position by resting its head against the mother's back.

Infants are fed "on demand" and have access to breast milk 24 hours a day. "On demand" implies an unstructured feeding pattern dictated by an infant's signals of hunger. It is rare to hear a young infant cry, and if one does, the crying is quickly pacified. Women are very attuned to the infant's need to nurse and will provide the breast well before a infant reaches the point of crying. Even when tightly swaddled, infants make small subtle movements or sounds which signal their desire for feeding. Infants remain close to their mothers day and night. Babies sleep

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[13] Hand-woven cloths used as shawls and for carrying babies, food, etc.

in the same bed with their mothers and thus have relatively easy access to the breast throughout the nighttime hours.[14]

An infant who awakens and begins to move is held by the mother and given the breast to suckle. If the mother is carrying the baby, she unties the llicla which is knotted at her chest and swings the baby onto her lap and begins to nurse. After the baby ceases sucking, it is put back into the llicla and tied onto the mother's back again. During some feedings the mother will unwrap the swaddling and replace the wet clothes with dry ones. During the change the baby will squirm and move its legs and arms and the mother may play with the baby. However, the infant is not exposed to the cool air for long and is quickly reswaddled once the wet clothes are replaced with dry ones.

Bottles were rarely observed and infant formulas are not yet a significant form of infant feeding in Ura Ayllu. On two occasions I saw women putting sweetened tea in bottles to supplement breastfeeding, although I never saw the children actually consuming the fluid. Another woman reported that she used a bottle and diluted canned milk when she became very ill, lost weight, and had difficulty producing milk. Once she was healthy, however, she resumed breastfeeding.

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[14] Vitzthum found that Nuñoa children are fed, on average, about two or three times during the night and that the co-sleeping arrangement continues until the child is about three years old (1988:141).

Breastfeeding continues well after children begin to show an interest in food. When a child starts grabbing for food, he is given a piece and allowed to play with or suck on it. Parents will experiment to see whether a child will take cooled liquids such as soup broth or tea but the offerings are not forced upon the child. The child gives the signals for what he or she wants and is indulged by the family members. Thus, young children start at an early age to familiarize themselves with food although they are not considered to be "eating" until their teeth appear, starting at about six months of age. Children's curiosity with food becomes stronger as they begin to crawl and walk. At this point they are not as physically attached to their mothers and may stay for short periods of time in the care of older brothers or sisters who also provide opportunities and encouragements to eat.

The process of weaning begins during an infant's first year of life.[15] Although breast milk remains the most significant form of nourishment, infants have begun to experiment with and acquire a taste for household foods well before breastfeeding is terminated. The consumption of of non-breast milk foods in a young child's diet increases during the second year of life and it is during this period

[15] Weaning is an extended process where breastmilk is gradually supplemented with household foods for several months, or years (Jelliffe and Jelliffe 1978; Millard and Graham 1985). The sevrage of breastfeeding may be abrupt--the child may cease to breastfeed from one day to another--but weaning itself has been an ongoing for an extended period of time.

when breastfeeding is severed and young children must adjust to a new eating regimen.

Childcare and Feeding during Toddlerhood

Toddlerhood (ages two to four) is a period of rapid growth and intense socialization. As a child grows there is a gradual strengthening of its body-soul bond as represented in its increasing animation, mobility, and independence. Children learn to walk, talk, play, and work primarily by observation and practice, and their efforts are not discouraged although they may produce laughter among the onlookers. During this period, children learn meal etiquette and the skills to eat more proficiently (e.g., use of spoons and dishes). There is a special vocabulary that children learning to talk use when talking about food. They have their own terms for food that are repetitive monosyllables--"tutu" for tostado, "chichi" for aycha (meat)--and are learning to distinguish foods.

Children also are socialized to the importance of food as a sign of hospitality. One day I made a visit to a family accompanied by the project director's four-year old son. We sat in the patio conversing with the mother and her three children who were very pleased to visit with the child. After a few minutes, her four-year old disappeared into the kitchen and reappeared with a bowl of toasted corn for my young companion. The corn had been prepared by this four-year old especially for his child guest.

Young children are rarely punished for any kind of misbehavior, although they may be scolded if bothering a younger sibling. Once a young child is walking, she is given free rein in the home but is rarely very far from an older family member. They are allowed to hold and manipulate knives and agricultural tools. Injuries are rare. In one instance I observed a toddler of two using a machete to peel the skin off a yacon;[16] the machete was bigger than she, but she skillfully and patiently peeled the tuber without incident. In another case a two-year old was walking around the kitchen with a large knife in one hand and a plastic water jug in the other. The mother gasped when she saw her daughter, running up to her and grabbing the jug from her hand before she punctured it.

Infancy is marked by indulgence in feeding patterns--the breast is available 24 hours a day whenever wanted--and this indulgence continues throughout the second year of life when toddlers are eating solid foods and complete meals in addition to breast milk. Diets during early phase of toddlerhood can be characterized as transitional, being composed of both breastmilk and non-breastmilk foods. As long as breastfeeding continues, children can be fed "on demand," that is, whenever their desire for food occurs.

Most Ura Ayllu women state that they cease breastfeeding when a child is about two years of age.[17] One

[16] Yacon is a sweet, crunchy root that grows wild in Peru.
[17] Women do not follow a rigid schedule when deciding to wean. A number of factors (e.g., pregnancy, maternal

of the more difficult aspects that occurs when a child is completely weaned from "on demand" breastfeeding is the removal of an ever-present source of food and nurturance; children must now adjust their appetites to a different schedule and routine. Mothers perceived that the toddlers were in a transition period, no longer breastfeeding but yet unable to eat like an older child or an adult.

Recognizing their young children's special needs and inability to cope with hunger, women provide them with food throughout the day. Wayk'u (steamed tubers) is a preferred snacking food because children like it and can serve themselves from the pot whenever they have the desire to eat. Leftover soup is generally not eaten cold but may be reheated for the children while the mother cooks the next meal. Bread is another favorite snacking food but its availability is usually limited since it is purchased.

By leaving foods for their younger children to eat between meals, women recreate the "on demand" feeding regime seen during infancy. This flexible meal structure continues throughout the toddler transitional phase. Thus, young children are not thought to be able to make a rapid adjustment to a fixed meal schedule at the age at which the breast was no longer available to them. Women guide their children through this phase by indulging their appetites and keeping them well fed.

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illness, or lack of desire on the child's part) may determine the timing of complete weaning.

There is not an absolute cut-off age when children pass out of this transitional phase of eating. Children of all ages are indulged whenever possible but parents expect older children (over the age of six or seven) to be able to better control their appetites and cope with hunger as they mature. By the age of six, children have already begun to help with productive activities (cooking, herding, gathering cooking fuels). With the increase in economic activities comes an understanding of what it takes for a family to function, and thus a better understanding of the cyclical changes in the availability of foods.

To summarize, nurturance and indulgence are two prominent features of child feeding and care in Ura Ayllu. Mothers recognize the vulnerable status of young children and strive to minimize their exposure to life-threatening illnesses and hunger. The last section of this chapter focusses on hungry season and its consequences for household members, particularly young children and women.

Observations of Some Elements of the Ura Ayllu Foodway

The following section is divided into three parts. The first part is a description of a "typical" morning in a Ura Ayllu kitchen and is representative of the community. Its focus is on cooking and eating and the rhythm of household activities during the early morning hours. This is followed by a description of kitchens, the locus of

household food preparation and consumption. The third part provides an overview of cooking and eating within Ura Ayllu.

A Morning in late June

The sky brightens gradually while the burros and roosters stir and announce the arrival of a new day. It is 5:30 a.m. and the home of Francisco and María is quiet as the family enjoys the last few moments of warm slumber before encountering the cold morning air. The high-pitched voice of the araría (town crier) punctuates the early calm as he makes the day's announcements. Today, he says, everyone must gather to work in the communal fields by the school. Inside the house, people begin to move and talk quietly until the dented metal door squeaks open and Maria exits. Smoothing her tousled braids and adjusting the well-worn lliclla (woven shawl) around her shoulders, María glances upward to the cloudless sky as she makes her way to the kitchen. In fluid movement, María pushes opens the kitchen door as she bends and steps over the threshold, ignoring the squeaking qowi (guinea pigs) that scurry to the dark corners of the room. The hearth is cold and the empty cooking pots are sitting where she left them the night before. Another day begins.

Inside the dark kitchen, María quickly gathers up handfuls of straw, dried leaves and stems which lie in piles on the floor. Squatting in front of the fired-clay qoncha (stove), she pushes the fuel into the opening and lights the

fuel with matches that are stored in a crevice in the stone wall. The fire burns quickly, smoke rising through the sooty straw roof. María goes outside to the patio to retrieve the old metal bucket of water left over from the previous night's meal. Upon her return, she stops to restoke the fire that nearly burned out during her brief absence. Water is poured into the charred, dented kettle and is put over the flames to boil. María then puts the hiki (a cooking vessel with the opening on the side, used specifically for toasting grains) on the other burner to heat and hurries out of the kitchen to another room in the dwelling where the food is stored. She returns with two cobs of dried corn and squats in front of the stove while she removes the grains and stokes the fire.

Two of the children enter the kitchen, rubbing their eyes and adjusting their tattered clothes. After a few minutes of warming themselves near the stove, the eldest, a daughter Eufracina, is sent to fetch more water from the nearby stream, while the son Pedro takes over his mother's tasks. María leaves the kitchen to retrieve the baby, Eleodoro, who is still sleeping in the bed. She returns with the infant Eleodoro to her spot by the fire and begins to breastfeed. Pedro has put the corn kernels in a clay bowl (<u>chua</u>) and is sitting quietly on the door stoop waiting for his next task. He is told to go to the garden and pick some collards for the soup and a few sprigs of yerbabuena for the <u>mate</u> (herbal tea infusion). Eufracina, who has just

returned with the water, is handed a couple of crumpled soles bills and told to buy some bread and a little rice at their neighbor's store. María, now sitting alone with the nursing baby, takes her free hand, puts the corn into the hiki and stirs it occasionally with a twig she has taken from the pile behind her. In between stirring, stoking, and feeding, she begins to wash the potatoes and oca for the morning meal. Maria scrubs the tubers carefully, picking the dirt out from the eyes, and rinses them two or three times in clean water. She puts a small amount of water into a clay pot, adds the smaller potatoes and oca, and then covers the pot with a chua (bowl) placed upside down. This is wayk'u (dish of parboiled tubers); it is ready for cooking when the mate and corn tostadu are finished.

María allows the fire to die down once the children return from their chores. Eleodoro, now satisfied, is sleeping on a pile of wool blankets on the bed at the other end of the kitchen. Eufracina gathers the cups and washes them while María puts the toasted corn into a tapi (bowl made from a gourd) and takes the kettle off the fire. She adds the sprig of yerbabuena and then runs to the main house to get the sugar that she will spoon into the kettle. Francisco, who had gone after awakening to visit a neighbor, and the children are now assembled inside the kitchen, awaiting their first meal of the day. María pours the mate into each of the cups to which she adds a handful of corn and gives each of them a piece of bread. The children sit

calmly to drink the hot, sweet mate while the parents quietly discuss the plans for the day. María then serves another round which they drink quickly; she must now continue to prepare and cook the remainder of the meal. The children jump up, thank their mother, and begin again to fetch water and food for the soup. Francisco leaves but will return to eat the wayk'u and caldo (soup) which María has started to prepare. She rekindles the fire from the embers and returns to her tasks of stoking, peeling, cutting, and nursing. Her motions rarely stop and by the time the meal is finished cooking, María's face is damp with sweat. Her perspiration stands in stark contrast to the frosty morning chill outside the kitchen. Breakfast is complete by 7:30, before the sun rises over the valley slopes and its rays hit the house, but Maria will not stop moving until well into the night.

Kitchens

The hearth is the axis about which the daily cycle of activities revolves. It is in the kitchen where the day begins and ends, and where a family unites for its most intimate social interactions in between dawn and duck. Most daily activities take place outside. Even when heavy rains confine people to their homes, people usually sit outside under a protective eave or just inside the doorway. Cooking and eating, in contrast, are undertaken indoors.[18] Other

[18] There are exceptions. For example, ritual cooking and eating are frequently performed outside the kitchen, in the

than sleeping, eating is the one activity that routinely brings a family together within the confines of the home. The kitchen provides warmth, protection, and sustenance, and signals the independence and economic well-being of the household. Indeed, it is the goal of every married woman to cook in her own kitchen.[19]

Kitchens are built apart from the main living dwelling. The walls are constructed of slate and daub and the roofs are made of dried ichu grasses which permit smoke to filter through. The packed dirt floors are slightly uneven. Compared to the main house, the kitchen is small, both in area and height, and the doorway is low. Even the shortest Ura Aylliño must stoop to enter the kitchen. The raised doorsill acts as a barrier to keep out rain drainage and keep in the domesticated guinea pigs (qowi) that inhabit the kitchen, living on food scraps. In general, kitchens are windowless and dim, the only light coming from the doorway which opens out onto the patio. A flat grinding stone is located outside, next to the wall, under the eave.

Kitchen furnishings are simple and include the stove, cooking and eating utensils, a bed, and a small stool or two. The two-burner stove is placed upon a low, packed-earth platform. Most of the stoves used in Ura Ayllu are made of baked clay and purchased from transient vendors from other parts of Puno. Some people construct their own

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enclosed patio. When working in fields, afternoon meals are consumed in the field.

[19] See description of Yolanda (household 15) in Chapter 2.

cooking stoves from hard, packed daub and stones. Cooking pots are often placed on the platform, to the sides of the stove, when not in use. Niches built into the wall may hold eating utensils--bowls, plates, cups, and flatware--as well as small cooking pots. The only food kept inside the kitchen includes small amounts of sugar, salt, and condiments, and these are kept either in the niche or in crevices in the stone wall. The bulk of the food must be brought from the larder in the main house.

Located at the opposite end of the kitchen is the bed. It is made of long, thin tree branches or reeds tied together with dried-grass rope, and is built into the walls. The beds are covered with piles of woolen blankets and often contain an odd toy, bowl, cup, or shawl. While the sleeping quarters are located in the main house, children, and sometimes adults or entire families, often spend the night on this bed after they have fallen asleep in front of the warm fire after the evening meal.

Small stools, measuring about six to eight inches in height, are found in most kitchens and are usually reserved for men or guests although women may use them while cooking. Children also sit on the stools if the father is away or is sitting on the bed. During a meal, women sit directly on the earthen floor with the female head of household sitting by the stove with the pots of food placed on the floor in front of her.

Cooking fuels are stored under the bed and in smaller piles near the stove. Thick logs, which are scarce in the Cuyo Cuyo habitat and must be collected or purchased from the lower forests far from the village, are often stored inside the main house rather than the kitchen. In some kitchens, particularly in the older ones, there is a simple two-pole structure that angles out from the wall behind the stove which is used to hold logs. This is a preferred place to store wet wood since the smoke rising from the stove helps to dry it.

Cooking and Eating in Ura Ayllu

Everyday life in Ura Ayllu is highly ritualized and patterned. Cooking and eating are no exceptions. It is through these activities that meaning and behaviors are learned and reproduced. While meals vary over the course of the day, among households, and across seasons, there is a basic structure and content which transcends these idiosyncracies and fluctuations. Breakfast, in particular, is the most standardized meal across time and households.

Meal preparation is, for the most part, women's business. While many hands help in various stages of cooking, it is the woman who orchestrates the process and serves the food to her family and guests. The provisioning of food is not a responsibilty that women take lightly. Meals should be prepared efficiently and be good tasting and sufficient to satisfy appetites. Being considered a good

cook is an integral aspect of a woman's identity. Some of the qualities that define a "good cook" in Ura Ayllu are organization, economy, knowledge and generosity.

At the level of everyday life (as opposed to ritual or special occasions) these qualities are expressed most clearly in the preparation of soup. The consistency, texture, and flavor of soup reflects largely on the expertise of the cook and on her ability to combine foods in appropriate ways. A soup should be neither thin and watery (segwe) nor thick and pasty (thaka), neither salty (q'echa) nor tasteless (chuma); the ingredients should not be overcooked (maq'a) or undercooked (hanku). An experienced cook knows how and when to combine ingredients to produce a good-tasting and healthy meals.

Women learn the subtleties of cooking in their natal households. Daughters are expected to help their mothers prepare meals and to take care of the younger children while mothers cook. Learning to cook by apprenticeship (seeing and doing) starts very early in a child's life, and by the time a girl is eleven or twelve years old, she is able to prepare complete meals and to fill in for her mother in case the older woman is unable to cook (in instances of illness, absence, or death). In fact, adolescent girls may accompany their father or other male relatives to Madre de Dios to act as cooks. In this setting, girls assume adult female household responsibilities--cooking, cleaning, and washing clothes--while the men work in mining.

Thus, by the time a young woman marries, she has had years of experience with cooking and spends the first few years of marriage, when living in her husband's househol, adjusting her techniques to meet with her husband's and mother-in-law's approval. While a woman lives with her husband's family, she often acts as assistant to her mother-in-law who continues to take primary cooking responsibility. Sometimes, however, the new wife will cook separately when her husband returns home from mining.

Meals are structured events. Once the cooking is finished, the family assembles in the kitchen. The woman sits in front of the stove with the pots of food in front of her on the floor. The youngest children, toddlers, sit next to her or near an older sibling. The husband sits on a stool, the bed, or on the door stoop, always off the ground. The rest of the children eat wherever there is space and sometimes, during the day, take their dishes outside to the patio to eat. The woman first serves the wayk'u, either in individual bowls or in a large dish from which everyone will share. Then the soup is served. With the bowls placed in front of her, the woman ladles the soup into the bowls making sure there is both broth and vegetables in each. If a toddler is hungry and whining for food, he or she is served first; otherwise the husband is served first, then the older male children, and then the others. The wife serves herself last. This procedure gives the woman control over portions.

The consumption of meat is one arena where woman's control over distribution is displayed. Meat is rarely eaten in Ura Ayllu, as indicated in Chapter 3. When meat is eaten it is usually guinea pig, alpaca or charqui (dried, salted meat or jerky). Guinea pigs are reserved for ritual or special occasions and were never consumed in the meals I observed. Alpaca meat is generally tough and only small amounts are put into the soup when it is prepared. Usually the woman puts in one piece and then after it is cooked, cuts it up into smaller pieces taking into account the number of people eating at the meal. When the soup is served, the pieces are carefully distributed to each family member, usually one piece each (in some cases the adult male and female may receive twopieces). Young children receive meat as well but are not always able to chew the tough, fibrous pieces; they prefer the collards. In their children's language they even refer to the cooked collards pieces as meat ("chichi").

Since meat was so rarely used, and considered a luxury food, I was particularly careful in my observations to see how it was distributed among family members. I was impressed with the equitable distribution (between males and females, adults and children) that I saw. While in some cases a man might receive two pieces to the woman's one, it was not unusual for the woman to make this up by eating a piece or chewing on the grisle and fat when cooking or serving the meal.

Women do try to cater to particular food preferences and tastes even through the variety of foods available in Ura Ayllu is relatively limited. Young children, who are just beginning to eat and getting accustomed to the various flavors and textures of food, especially may exhibit a preference for certain kinds of foods. For example, for a very young child, without teeth, the mother will feed the child broth or will mash the potato bits with some broth so the child can easily swallow the pap. Slightly older children may not like a certain ingredient as much as others, so the mother will take out those ingredients and put in the bowl those foods the children prefer.

Once the food is served, family members eat and converse. Small toddlers are assisted by their mothers or by older siblings. They are allowed to play with and handle the food in their bowls. If very small, mothers may spoon feed them.[20] Among siblings there is sharing of food and sneaking of food from one plate to another. For instance, two young boys in one family frequently fought over their food. The older boy would distract his younger brother and then steal the potatoes from his wayk'u. The younger one would cry and go to his mother who would give him a few more from the pot. In other, less antagonistic cases, older siblings might feed their younger sibling from their bowl

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[20] Children at this stage of eating-- playing, chewing, experimenting--were not included in the dietary survey.

and then take the food served to the youngster for themselves.

Children are encouraged to eat food as soon as they express an interest in it. It is expected that children need time to familiarize themselves with the various flavors and that these preferences are indulged by the family. An older sibling who knows the toddler likes potatoes may take a few out of his own bowl to feed the toddler.

The Crisis of Seasonal Hunger

In this section I describe the experience of seasonal hunger in Ura Ayllu. It is a description of how people, particularly women and children, define, experience, and respond to the seasonal fluctuation of their food resources. I begin by outlining the seasonal context of food availability and dietary patterns in the community. This is followed by a detailed discussion of the hungry, rainy season and its impact on the household. I conclude with a discussion of the responses of household members to the seasonal scarcity of food resources.

This research illustrates that seasonal hunger is not a "silent problem" when its victims are given an opportunity to voice their deprivation. When listened to, these voices vividly express the emotional dimensions which are typically overlooked in studies that focus on the physical manifestations of malnutrition and hunger. While no less important, physical measures provide only one part of the

story. The other, emotional part is expressed in the anxious sighs, the tearful discussions, and the painful and humiliating compliance with research methods that require the meticulous observance and measurement of people's deprivation.

Seasonality of Food Availability and Diet

Villagers divide a year into two distinct seasons. These seasons--chiraw tiempo and paray tiempo--refer, in a literal sense, to the cold season and the rainy season respectively. Linguistically, the terms are a combination of Quechua and Spanish words--chiraw and paray are of Quechua origin and tiempo is a loan word from Spanish. Climatologically, these local terms identify seasonal variation on the basis of both temperature and precipitation (rainfall) contrasts during the year. Because climatic seasonality in the tropics is typically classified along a wet-dry axis (Walsh 1981), I will modify the local terminology to make the contrast more comparable. In other words, the cold season will be referred to as the cold-dry season while the rainy season retains its original meaning as the rainy or wet season.

Although climatological criteria provide the basis of seasonal variation, the meaning of this dichotomy extends beyond its literal definition. Chiraw tiempo and paray tiempo also signify the cyclical periods of food abundance and food scarcity in the community. These are emotionally

charged terms which express a wide range of social and economic realities with respect to a household's well-being.

The cold-dry season of chiraw tiempo begins in April when the persistent rains have tapered off. It is centered on the months of June, July and August when the predominately clear skies produce warm days and frigid nights, and it ends in October when the rains resume. In terms of the agricultural cycle, the cold season corresponds roughly to the post-harvest and planting periods (see Chapter 2 for more details).

The harvests, in combination with other foods purchased in stores using the cash brought back by returning seasonal migrants, provide households with abundant food supplies which are reflected in the diet. The morning meal consists of a hearty soup prepared with liberal amounts of potato and oca, and a large pot of the steamed tubers (wayk'u). The midday meal is either prepared and eaten in the home or, when work takes the family outside of the home, prepared in the morning and then carried to the fields. When the meal is eaten at home, it includes a thick soup, steamed potatoes and ocas, and, in some cases, an entree (segundo) of rice with a noodle and vegetable stew. The moveable fare (fiambre), on the other hand, typically includes steamed tubers and toasted or boiled corn or broad beans. The evening meal is similar in content and size to the morning meal. In general, the diet during the cold-dry season is

diversified and plentiful and includes both cultivated as well as purchased foodstuffs.

The bounty of the harvests parallels the flurry of social and economic activities that take place during the dry-cold season. The dry climatic conditions and the return of the wage-earning migrants allow families to engage in a wide range of chores. They include the preparation of the fields for planting, the collection of cooking fuels, and the maintenance of the terraced fields. These activities, and others such as weddings, the raising and repair of houses, the freeze-drying processing of potatoes (chuño) and oca (khaya), and several fiestas, combined with replenished household food stores, merge to create a period of social abundance. The tenor and rhythm of life reflects the munificence, and food, as the predominant currency in social and economic interactions, flows freely and conspicuously through the community.

In contrast to the abundant food supply of the cold-dry season, paray tiempo (the rainy season) is wet, and food, as well as cash, are in short supply. The rainy season extends from November through March with the heaviest, seemingly relentless, rains occuring in January and February. This rainy period corresponds generally with the agricultural pre-harvest season. In November most men and teenage boys, as well as a few teenage girls who act as cooks and laundresses, begin to migrate from the community to the gold mines in the Amazon Basin (Madre de Dios). Agricultural

activities, which now are limited to the weeding of the fields and overseeing of the crops, become the responsibility of the women and children who remain in the village. During this period, women anxiously await the upcoming harvests and monitor the dwindling food supply in apprehension of the heavy rains of January and February.

Meals during the rainy season tend to be less substantial than they were in the preceeding months. Soups are thinner due to the smaller portions of tubers that would otherwise add bulk. Steamed potatoes and oca are served as a separate dish only on rare occasions, and then the portions are much smaller than during the cold-dry season. Rather than being something to fill up on, potatoes and oca now are considered a treat.

As home food stores shrink, processed and purchased foods assume a more central place in the diet. For example, foods such as chuño, khaya, wheat flour, barley, rice, and noodles are substituted for fresh tubers in soup. This substitution results in a thick, porridge-like soup with few vegetable ingredients. One woman described the change in her family's diet in graphic terms. She explained that soup is composed of two parts: q'alla, the dense, compact, chewy elements such as potato, oca, and other vegetables, and allpi, any form of starchy thickener which gives the broth a more smooth consistency. She went on to say that during the cold-dry season the q'alla is the center of the soup while the allpi is the additive which provides body for the

liquid. During the rainy season, however, the starchy allpi becomes the center of the soup and additional body is limited to a scant few pieces of potato, oca or cabbage. In other words, a transposition of the elements which comprise a soup takes place over the course of an annual cycle. The compact, chewy elements which dominate the soup during the cold-dry season diminish in availability during the rainy season. The allpi which is a necessary complement to the soup in the cold-dry season now assumes the position of primary importance. This transposition, which is considered less desirable and less nutritious, is the result of the seasonal waxing and waning of available food resources.

As discussed in Chapter 2, diets in Ura Ayllu vary over the course of the agricultural cycle. During the cold-dry season, household stores of food are abundant, reflecting the produce available from the harvests. Although purchased food is consumed during this period, the majority of foods in the diet comes from household production. It appears, too, that although a greater range of foodstuffs are available during this period (foods acquired through production, purchase and barter), diets are generally comparable across households.

During the rainy season, however, as household food stores dwindle and diets become more dependent upon purchased foods, the amount and kinds of food being consumed vary considerably among households. This disparity between households was apparent during my last round of food intake

measures in November and December 1986. At this time, some families still were eating foods, such as potatoes and oca, from the previous harvest. These had long disappeared from the diets of other families. This discrepancy between households was also observed among families whose diets were more dependent upon the use of store-bought foods. In this case, some families were eating a wider variety of these foods, such as rice, noodles, barley, toasted wheat, than were others whose diet revolved around less expensive wheat flour. These data suggest that although all families face shortages of locally-produced food, some families are affected more acutely than others by the scarcity of food and by their ability to purchase a variety or even enough substitute foods.

For these latter families the rainy season is a period of real crisis. This crisis is known as halaykuy (a word derived from the Spanish jalar, to pull) and refers to a more grim and fearful existence than does the seasonal reference paray tiempo. That is, the crisis or halakuy differs from paray tiempo in its gravity and in its specific allusion to precarious food supplies and the experience of hunger. While all families experience, at differing degrees, the limited food supplies associated with the rainy season, only some families reach the stage of extreme insecurity or crisis denoted by the term halaykuy.

This period of crisis is discussed in more detail in the remainder of the chapter. The structure and content of

these sections are largely derived from women's statements during informal interviews and conversations. The first part focuses on creation of the crisis--its onset, duration, and intensity. This discussion is followed by descriptions by women of the experience and impact of halaykuy on their families.

A Focus on the Crisis

People view this season of food scarcity as having different phases of severity. They identify the onset of the crisis as the last months of the cold-dry season during tarpuy, the time of planting, in August and September. At this time, seed, which had been separated at the end of the harvest from food earmarked for consumption, is taken from its storage areas in the house and sown in the fields. One woman states that the "ghost of the crisis" appears at tarpuy, when she watches her food supplies diminish in accordance with the planting of each crop. Having seen women take great pains in separating the newly harvested produce, I was somewhat suprised by these statements. If the categories of seed and food are clearly demarcated, why should planting affect the availability of food?

These data suggest that the separation is not final until the seeds are planted in the earth. One situation that may jeopardize this separation is insufficient food. If, for whatever reason, the harvest were small, insufficient amounts of the crop would be available for both

seed and consumption. Although an adequate amount of seed may be set aside for the planting of the next year's crop, people say that when the amount remaining for consumption shrinks, a woman faces the choice of taking the needed food from her seed stores. This decision must balance the immediate needs of family members against the longer term consequences for the future. Once planting takes place, however, the seed is no longer available for consumption.

A second situation that may jeopardize the separation of seed and food is when an insufficient amount of seed is available for planting and people resort to their consumption stores to make up the difference. This situation would occur, for example, when an inadequate amount of seed was set aside at harvest or when post-harvest storage resulted in losses or destruction of seed due to rotting, diseases, and rodents. Thus, it appears that planting makes competition between seed and food almost unavoidable. When planting begins, the need for an adequate future harvest requires people to give preference to seed even when food resources are scarce.

Following closely on the heels of <u>tarpuy</u> are two religious festivals of great importance in the community--Rosario on the 8th of October and All Souls' and All Saints' days on the 31st of October and the 1st of November--which act to drain a household's food supply. The week-long fiesta of Rosario, the largest festival of the year, is elaborately celebrated with abundant amounts of food, drink,

dancing, and music. The All Souls'-All Saints' Day festival, while smaller than Rosario, also requires the public display of food resources. During this holiday, each household is enjoined to provide special breads and foods (e.g., tropical fruit, candy, crackers, and alcohol) for the souls of deceased family members. It is thought that the souls of the dead return to the cemetary on the night of the 31st to eat and drink with the living family members. If a family does not provide these foods, the souls cry and suffer and may bring retribution to the family in the form of illness or other misfortunes.

It is not only fear of spiritually-induced punishment which motivates women to provide elaborate foods during these fiestas. Fear of social disgrace and public ridicule also impel women to devote their scarce monetary and food resources even when they cannot afford to do so. One woman describes these fiestas as times of constant social visits and states "it would be very bad if people did not see us eating well." She is aware of the social and ritual obligations which require her to "exhaust the last reserves" that she has. Thus, the compulsory expenditure of food and cash during these fiestas is identified by women as another factor that contributes to the progressive depletion of these resources within households. Fiestas serve not only as markers of time and important events throughout the year, but as catalysts which accelerate a household's downward slide toward hunger.

At this point in the annual cycle, as the rains intensify and the harvests are still several months in the future, household food stores become smaller and smaller with each passing day. The progressive depletion of food is cause for fear and anguish for many women who realize that their situation will persist and worsen before it improves with the upcoming harvest. This fear was obvious when, in mid-November, one informant remorsefully sighed: "If I am like this now, how will I be in December and January?"[21] Thus, the dwindling food supplies are constantly monitored by the women who realize the worst is yet to come.

The "worst" refers to the period immediately preceeding the potato harvest, between Navidad (Christmas) and Candelaria (early February), and is the time when food scarcity can become a living nightmare. This stage of the crisis is known as hatun paray (the big rain). It is the most dreaded and frightening time of year for many women as they attempt to balance their sparse food supplies with the growing hunger of the household members.

Indeed, as I discovered, the mere mention of the phrase hatun paray elicited long, emotional discourses by women as they described their impotence in dealing with the scarcity of food and in alleviating their family's, particularly their children's, hunger. After identifying this time

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[21] This interview took place in mid-November. The eight-member household had already consumed a 100 pound bag of flour and had started a second.

period as the most critical and frightening stage for her household, one woman went on to say

> for me this is the most difficult time, when I would like to die or escape, running from the house, and not to have to support my children any longer. I become desperate with their shouts and their continual crying of 'hunger'...above all the youngest ones, but when you add it up, all of them are always demanding food.

This woman's powerlessness to remedy the hunger and anguish of her family is clear. Her perception of the crisis underscores the psychological distress felt by women at this time.

Shrinking food resources and crying children are not the only determinants of this pre-harvest crisis. Women describe other factors that intensify the overall desperation of the rainy season. For example, the persistant rains affect the collection of dry cooking fuels. Not only is the task of gathering the leaves, stems, grasses and branches more difficult and dangerous when the steep, rocky slopes are slippery wet, but the fuels themselves are often wet. Using wet fuels prolongs cooking, a process which is already emotionally difficult due to the lack of food and the eager mouths that await it.[22]

The inclement weather conditions also restrict daily activities for both adults and children (school-age children are now in summer recess) and often require them to stay within or close to home in cramped quarters. According to the women, this lack of activity and confinement in the

[22] Foods cook very slowly at high altitude; wet fuel prolongs the process further.

house results in boredom and inevitably thoughts turn to food. The combination of boredom, heavy rain, severely limited food supplies, and restless, hungry children produced anxiety in women. The ominous gloom, which shrouds households like the damp, cold rainclouds overhead, is tempered only by the lush, verdant blanket of crops covering the hillsides which signify hope for future abundance.

Although the replenishment of food stores does not take place until the harvest of the crops between March and June, many families employ an agricultural practice which helps them to buffer the scarcity of food during this pre-harvest season. This practice involves the planting of "early" potatoes in one or two small plots in July, and the strategic "harvesting" of them during the most severe stage of the food crisis in late December and January. The potatoes are reaped on an "as needed" basis and only small amounts--usually enough for one or two meals--are excavated at any one time. These harvests are referred to as ancacha, which means help or respite, and allow families to "get by" this critical period. Thus, people recognize the necessity of an auxiliary food source and strategize to mitigate to some extent the distress and the pangs of hunger felt at this time.

To summarize, the hungry season is viewed by the villagers as a multi-faceted, intensifying sequence of events and circumstances. It begins with the planting (tarpuy), builds in intensity during the subsequent months,

and then ends with the harvest of potatoes in March. During each of these phases a constellation of factors that relate to the agricultural cycle, ritual calendar, climate, and economic activities combine to create the crisis of hunger. While a lack of food may be the basic, underlying cause of the hunger they feel, these other factors are also involved in the creation and intensification of the crisis.

It is clear from my observations and from the statements of informants that this crisis does not affect all families in the same way or to the same extent. The crisis, as several women stated, is relative to a family's situation. Factors they mentioned that would affect the experience and severity of the rainy season include: amount of land, the quality and quantity of agricultural production, number of household members, appetites of household members, and access to cash to purchase foodstuffs. Hunger, then, is neither a homogeneous experience--it affects some households and not others, and it affects some more acutely than others--nor is it a "natural" stage in the annual cycle that all households pass through but a product of a number of factors--social, economic, and political--that lie both within and outside the household's walls and control.

The Household Response to Hunger

Mothers are particularly aware of their children's hunger at this time. Women say that a child's "hunger is

stronger and grows" in this season and that "they need to eat more than in other times...and it is precisely this moment when there is so little food." Women say too that "their [the children's] appetites are larger and they are more interested in food" than during the harvest "when they are less interested in food because they are always eating." These statements reveal that mothers are acutely aware of children's hunger as well as their own inability to still this hunger. The inability to assuage children's hunger creates a situation of despair and frustration for mothers who must act contrary to their understanding of how children should eat in order to remain healthy.

Because young children are fed on demand, they cannot understand why food may not be available during periods of scarcity. Women state that the older children, who have experienced the food shortages in the past, generally "understand the problem, do not demand food as much, and can cope" with the amount of food that is available. The older children are also able to cope by leaving the house for the day, or part of the day, to work for other families. The little ones, however, who are dependent upon the mother, are viewed as being "attached to the cooking pots" and "because they are small and not able to understand, are always demanding food, especially potatoes, and then cry" when they do not receive any.

During the cold-dry, abundant season, large portions of steamed potatoes and oca purposely are prepared during the

morning meal so that leftovers are available for the young children's snacking. These leftovers are put in the kitchen, and children may come and go freely to eat whenever they feel hungry. Similarly, when agricultural work takes the mother and small children outside the home for the day, large amounts of boiled tubers are brought along to provide the food for the mid-day meal and snacking. Fruit, brought from the tropical lowlands in trucks on their way to Juliaca, is readily available at this time and is a favorite treat for children. Older children also snack even though it is not considered as necessary to meet their food needs.

This is the way mothers would prefer to feed children but they painfully acknowledge that they are not always able to follow this pattern. This inability is most apparent during the pre-harvest rainy season when the supply of food is most limited and when the young children's food needs are perceived to be greater (see above). Given the condition of scarcity under which they live, women must alter the types and quantity of food they allocate. These alterations, while necessary, are often made against a woman's better judgment. For example, the limited quantities of potatoes and oca prohibit their preparation as snacking foods. Instead, some mothers may prepare and set out toasted broad beans and corn for snacks, much to the dismay of the children who prefer the taste and texture of potatoes and oca. According to the women, the young children, who do not comprehend the scarcity, and thus the absence of their

favorite foods, continually cry for the food their mothers cannot provide. In damp, cold, and confined quarters, the children's cries are a piercing reminder of a mother's inability to indulge her children's appetites.

Mothers, who are aware of the competition between household members at this time, often go to great extents to lessen the hunger of the little children. One woman explained that she hides away some potatoes and oca which are later cooked "for only the smallest children because they are always asking for potatoes." Other women said that the rainy season is the time for them to "tighten the stomach so as not to take food away from the little children." My observational data indicate that a mother will limit her own intake on behalf of the children. In these cases, women served herself only one portion to the children's two. While these attempts to pacify children's hunger are only stop-gap measures, they do temporarily relieve some of the immediate anxiety felt by both children and mothers.

In an attempt to lessen some of their own anxiety, mothers often chew coca, particularly before retiring for the night, to deaden their own hunger, and to temporarily dull the melancholoy and despair they feel at this time. In describing her situation, one woman said that the cries of her children make "me desperate and confused seeing the children in this state." As her agony and impotence to remedy the situation grows, she states her need to chew coca

increases, and having done so, "it is as if I never felt hunger nor pain...and I begin to think positively about how I will acquire a little food for the children." Although most children under the age of fourteen or fifteen usually do not chew coca, others begin earlier because, as one informant astutely remarked, "poverty obliges them to learn."

Coca, then, is one way in which women attempt to endure the physical and emotional pain of hunger. They also seek other ways to deal with the problem. To acquire badly needed food and cash resources, women avail themselves and their children to work for other households both within and outside the community. For example, during this period of reduced agricultural work, women hire themselves out as weavers. Starting at about six years of age, children work as shepherds and receive their midday meal from the employer. They also are payed in food which is brought back into the household. Teenagers, in particular teenage daughters, often migrate, for a couple of weeks or a month, to the lower-lying communities in the province to work in the harvests of corn and coca.

Payments for this sale of household member's labor are generally made "in kind." Remunerations of food are funneled back into the household diet while others, like coca, are in large part sold. The cash income from the sale is then used to buy household necessities which, at this time of year, "are always lacking" and all more expensive.

Remittances sent by the migrant miners, two or three times over the course of their absence, are also used to supplement the household larder. Women complain, however, that the amount never suffices and that the men, "who do not know the crisis," do not understand that everything in the household is lacking and that the money, even a good quantity, "disappears faster than it arrives."

Although women may complain that the men do not understand the gravity of this period and the pressures they must confront each day, women also consider men's absence a blessing. In fact, the absence of any family member, even for only one meal, is thought to be a relief. Not only does someone's absence signify an income but it also means "more food for the others [remaining in the household]." An individual's work outside the household releases his/her portions of food to those who remain behind.

The importance of the economic roles played by different family members for the maintenance of the household is recognized by women. For their role in bringing even small amounts of food into the household, children are referred to as "small lifesavers." The contributions of teenage girls, who make the longer trips and bring more substantial income into the household, are considered crucial for household survival. Their importance is conveyed in a phrase used by several women when describing their teenage daughters: "she raises us." Thus, through the mobilization of its members' labor, households

attempt to acquire the goods and cash needed for its maintenance.

Conclusions

In Ura Ayllu, as in many tropical rural areas of the Third World, people's lives vary considerably over the course of an annual cycle. Seasonal variations in food availability, social and economic activities, population, and weather conditions merge and interact in ways that create markedly distinct kinds of existence. The environmental and other differences between the cold-dry season and the rainy season is sharp and obvious. What is less obvious is how these factors interact and reinforce conditions of food abundance and scarcity, and how these conditions affect the people who live under them.

Through an exploration of the linkages between food availability, social and economic activites, population, and climate, this section has shown that the creation and experience of seasonal hunger is multi-dimensional and self-reinforcing. Hunger is ultimately associated with poverty and attempts to cope with hunger may lead to further impoverishment. Living in this cycle of poverty and hunger, involves, as people's statements have clearly illustrated, pain, humiliation, fear, and powerlessness.

Under this pall, the women of Ura Ayllu worry most about the young children. Women's inability to indulge their children's appetites violates their beliefs about how

children should be fed. Although the logic remains intact, women's ability to follow it changes in accordance with the food available. Research in another highland Peruvian community also indicates that children are protected from seasonal dietary fluctuations (Leonard 1987). The quantitative data presented in Chapter 3 also shows a similar pattern in Ura Ayllu. These data suggest that women's overt concern about their children is exhibited in food allocation patterns. Relative to their energy needs, young children fare better than their mothers at this time of year.

This research also suggests that livelihoods which are based on seasonal fluctuations are, to various degrees, repetitively insecure. Because these oscillating patterns are cyclical, hunger, as an extreme expression of insecurity, may repeat itself from one year to the next. Although insecurity and limited choices require people to manage resources and schedule events in accordance with these seasonal and annual cycles, these strategies do not preclude the experience of hunger. At any given point in time, then, the reality of the present--whether it be abundance or scarcity--is always counterbalanced with what came before and with what lies ahead. Thus, people possess the secure knowledge of their uncertainty.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

Introduction

Food is both profoundly social and biologically essential. The goal of this study has been to examine both the social and biological dimensions of the Ura Ayllu diet, especially in regard to mothers and their young children. My aim was not only to analyze Andean nutrition but also to understand the social processes that produce it.

As discussed below, the findings of the dietary analyses of this study further our knowledge of the biology of Andean nutrition and growth. This research also explores the issue of hunger, a topic which is generally not discussed in the Andean anthropological literature but which would be difficult to escape in any accurate analysis of major issues concerning food in Ura Ayllu. In a recent article, Starn (1991) examines the anthropological representation of Andean society in light of rural unrest and the rise of the Sendero Luminoso revolution. He criticizes Andeanist cultural anthropology for its narrow focus on adaptation, ritual, and cosmology and its tendency to overlook unrest, political ferment, and the "profound

rural dissatisfaction with the status quo" (ibid.:64; see also Taussig 1980). He states:

> All Andeanists recognized poverty. But the stress on ecological adaptations and sophisticated symbolism had as a consequence a tendency to minimize the full extent of the economic suffering across the countryside. Ethnographers usually did little more than mention the terrible infant mortality, minuscule incomes, low life expectancy, inadequate diets, and abysmal health care that remained so routine....They gave us detailed pictures of ceremonial exchanges, Saint's Day rituals, wedding, baptisms, and work parties. Another kind of scene, just as common in the Andes, almost never appeared: the girl with an abscess and no doctor, the woman bleeding to death in childbirth, a couple in their dark adobe house crying over an infant's sudden death (Starn 1991:79).

The goal of this research is not to downplay the adaptive sophistication or cultural richness of Quechua culture but to add to our understanding of the day-to-day life of Andean peasants. I did not go to Cuyo Cuyo to find hunger or malnutrition. I expected to find that Cuyo Cuyeños were eating and living well, that they were somehow shielded from the oppressive poverty under which most Peruvians live. Nevertheless, I did witness hunger and suffering. The question that lay before me was how to talk about it, how to reconcile my observations with the prevailing currents of Andean anthropology. This research, therefore, is an attempt to illustrate with both nutritional and socioeconomic data a different view of Andean reality, one that lies behind the elaborate and conspicuous consumption evident during ritual festivals.

Seasonality and Nutrition

This study has dealt with seasonal changes in the Ura Ayllu diet and their effects on households, especially on young children. To this end, I observed a sample of fifteen households over the course of one annual cycle, from the beginning of the 1986 harvest to immediately before the 1987 harvest. I used nutritional methods (food weighing and anthropometry) to gather quantitative data on diet, nutrition, and growth, and standard anthropological methods (participant-observation, informal interviews, and questionnaires) to collect information on the social aspects of food and diet.

The data collected at three different points in the annual cycle illustrate that food consumption in Ura Ayllu is linked to agricultural production and reflects seasonal changes in the availability of food resources. During the harvest period (late February to mid-May), the diet largely is made up of crop foods. At this time of the year, tubers (potato, oca, olluco and isaño) provide more than 60 percent of all calories consumed. As the harvests of the other crops--maize and broad beans--are completed (the post-harvest season in late May to early August), the percentage of energy provided by tubers decreases to 46 percent but they remain the most important source of calories in the diet. Calories from other foods such as corn, beans, and processed tubers, increase slightly at this time. As the year progresses, local foods become more scarce. Fields are

planted in August and September just before the rainy season begins. It is during the crop growing phase of the annual cycle (or pre-harvest season, in late October to early January) that women carefully monitor the diminishing household larders and supplement the diet with market foods. The most important source of calories during the pre-harvest months are purchased grain products, such as wheat flour, rice, and noodles, which at this point of the year provide almost 40 percent of all calories. Although these foods are eaten in small quantities year round (16 percent during the harvest season and 17 percent during the post-harvest season), this is the only period of the year when commercial foods dominate the Ura Ayllu diet.

Energy intake also varies over the year but not in the way that might be expected. If calorie intake reflects the seasonal availability of food, it would increase during the harvest, peak during the post-harvest, and ebb during the pre-harvest seasons. Energy consumption of toddlers inverts this predicted trend. It is highest in the harvest season and lowest in the post-harvest season. Caloric intake during the pre-harvest season rises again but falls short of that in the harvest season. In other words, energy intake of young children falls to the lowest annual level precisely at the time when it is expected to be the highest. This unexpected result suggests that young children are buffered from seasonal stress during the pre-harvest season. It also

may be attributable to methodological bias or to other factors as discussed below.

Analysis of energy intake for each age group indicates that children's energy intake does not differ significantly by sex in any season. It appears that the allocation of food to boys and girls is similar, contrary to many generalizations in the literature about rural households in less developed countries (Carloni 1981; Chen et al. 1981).

The unexpected pattern in amounts of energy consumption is reflected in the analysis of dietary adequacy as well. Children's calorie intake is adequate during two seasons of the year, and one of those is the rainy season. During the harvest and pre-harvest seasons, average caloric intake exceeds predicted requirements for both toddlers and pre-schoolers. It is only during the post-harvest season that the caloric adequacy of young children's diets falls below predicted requirements. In the case of toddlers, the drop is extreme. During the harvest season toddlers are consuming 114 percent of their energy needs; in the post-harvest season they are consuming only 65.5 percent of the requirement. Thus, the dietary data indicate that young children are meeting or exceeding their predicted energy needs, except during the post-harvest season when food supplies are high.

The finding that toddler caloric intake falls dramatically during the post-harvest season does not follow the pattern observed in another Andean nutritional studies

(Collazos et al. 1954; Leonard 1987; Thomas 1973). I hesitate to emphasize this result for three reasons. First, it is difficult to reconcile with the discourse on hunger (see below). Second, this type of result leads to questions of data reliability. However detailed examination of the data and omission of the very lowest cases of energy intake did not change average energy intake significantly. Although the data seem to represent accurately children's intake at meals, they may have a methodological bias, in that children may have freer access to food outside of regular meals and outside of the home, as food seems to be plentiful in that season. And, children have been encouraged to eat frequently.

Third, one might also question the standards by which energy intake is assessed. In this study, however, I have compared observed energy intake to a predicted requirement calculated specifically for a highland Peruvian population (Leslie, Bindon, and Baker 1984; Leonard 1988). The predicted requirements calculated by this model are lower than other nutritional standards, such as the FAO/WHO/UNU (1985) and NRC (1989b) recommended allowances, and thus, do not seem to be overestimating the extent of energy deficiency.

Overall, the results indicate unexpected seasonal dietary patterns. Energy intake decreases when it is expected to be high during the post-harvest. During the pre-harvest months, intake is not as low as would be

expected from people's description of that season. It is possible that the minor harvests of early-maturing potatoes in late November and December allow households to maintain adequate energy intake during the pre-harvest and may explain why intake does not decrease more markedly.

Seasonality and Economic Variation

Agricultural production is insufficient to carry households comfortably through the year. The pre-harvest season is the time when stores of home-grown food are reduced and access to commercial food is crucial. The Ura Ayllu diet is more heavily dependent upon purchased foods, such as flour, noodles and rice, than locally grown foods at this point of the year. Because some households may be better able than others to purchase the foods they need at this time, caloric intake data were analyzed according to household economic status.

Although Ura Ayllu shows few outward signs of socioeconomic stratification, there are differences in housing, material possessions, landholdings, and income from agricultural and off-farm remunerated work. For the purposes of this study, I attempt to capture these differences in a relative scale of wealth. Based upon the above criteria, households were ranked and divided into three economic strata ranging from poorer to more wealthy.

An analysis of energy intake per capita, including all household members, shows statistically significant

differences among economic strata during the pre-harvest season. Per capita energy consumption is similar among economic strata during the harvest and post-harvest rounds. Furthermore, the data on the pre-harvest season indicate that the composition of household diets is similar in regard to the array of foods used in meals in all economic groups. The wealthier families, however, apparently have larger stores of homegrown foods and are able to purchase a larger quantity of food than the poorer households. Thus, they eat relatively more of the same basic array of foods. This finding suggests, therefore, that diets are affected not only by the availability of food grown in the community but also by a household's ability to purchase food. The following analysis of children's energy intake, however, shows that dietary patterns are more complex than indicated by this finding.

Children's mean caloric intake was analyzed by season and by economic status. During the harvest and post-harvest seasons, there is no significant correlation of energy intake and economic status for either age group. In the pre-harvest season, economic status is significantly correlated with energy intake among the 4 to 6-year olds, but not among younger children or adult women. This suggests that pre-school children in families from the highest economic stratum have significantly higher energy intake than those from other families. These findings may

also suggest that toddlers receive preferential treatment relative to their slightly older siblings.

The relationship between energy intake and economic status is not as strong as I had expected, and it appears that economic status is not the sole determinant of dietary variation. These findings suggest three possible problems. One, the measurement of economic status did not capture the essence of wealth in Ura Ayllu. Future analyses will explore alternative definitions of wealth and whether these are better able to explain dietary variation. Two, between-meal eating, which was not measured, may be related to economic status. Thus, children of wealthier households may have more access to food between meals than children of poorer households. Because I was unable to measure between-meal snacks, this may have some bearing on the results. And three, the findings do not correspond to the discourse on hunger discussed below. Since poorer mothers claim that they try to buffer young children from seasonal hunger, it was not surprising that toddler intake is not correlated with economic status. On the other hand, I expected women's intake and economic status to be correlated because women stated that they often indulged children at their own expense. Women's discourse may represent a memory and anticipation of hunger which is different from my measurements of an agricultural year with bountiful harvests, like the year in which the study was carried out.

Anthropometry

A number of studies have demonstrated that physical development among Andean populations is slow and prolonged, resulting in small adult body size (Beall et al. 1977; Frisancho 1976; Frisancho et al. 1980; Greska 1986; Leonard 1989a,b; Leonard et al. 1990; Stinson 1980b, 1982). Anthropometric analyses of weight for age and height for age indicate that young Ura Ayllu children exhibit growth patterns similar to other high-altitude Andean populations (>2,500 meters).

Analyses of mean body weight and stature for each age group revealed no significant differences between females and males. This result supports the findings from other studies that indicate late establishment of sexual dimorphism, especially in stature, among Andean highlanders (Frisancho 1976).

Mean body weight and stature were converted to standardized Z-scores according to the age- and sex-specific means for U.S. subjects provided by Frisancho (1990). In this study, both the toddler and pre-schooler groups fall below the average weight-for-age. Height-for-age is even more depressed, and falls below the 5th percentile (the lowest percentile for which data are available). Height appears to be suppressed relatively more than weight, at least with respect to the reference population. The fact that the body weight of Andean children falls below the average in the standard may be related to their short

stature. Like other highland children, Ura Ayllu children are very short for their age and below average weight.

Measurements of body weight and stature were also analyzed by economic status. Body weight and economic status are not significantly correlated in either age group. Thus, the economic standing of a household does not appear to have any effect on children's weight. Analysis of stature and economic status, however, does result in a significant correlation in the toddler group. Toddlers from poorer households are shorter (77.6 cm) than toddlers from wealthier households (80.7 cm and 84.7 cm).

The slow linear growth of Andean populations has been interpreted as a result of multiple factors. Delayed growth is due in part to smaller size at birth (Haas et al. 1982) and to the synergistic influence of genetics, hypoxia, and caloric deficits (Greska 1986). Several studies have examined the relationship of hypoxia and growth, but a recent study in Nuñoa suggests that nutritional factors may play a more important role than was previously thought in shaping highland growth patterns (Leonard et al. 1990).

Findings of the present study indicate that growth stunting is exhibited among pre-schoolers even when caloric intake appears to be adequate relative to the predicted requirement. As discussed above, the energy intake of pre-schoolers dips slightly below the adequate level during the post-harvest season, but the decline is insufficient to explain the extent of stunting observed. Toddlers, on the

other hand, do show statistically significant differences in caloric intake between seasons, and during the post-harvest season their intake falls markedly below the requirement. Thus, it appears that seasonal deficits in calorie intake may contribute to stunting among toddlers, and that the stunting seen among pre-schoolers may be, in part, the result of caloric deficits experienced during toddlerhood. Although energy intake appears to be adequate for much of the year for toddlers and year-round for pre-schoolers, it may be insufficient for catch-up or rapid growth. In other words, children's energy intake may be adequate for maintaining slow growth, given their small size, but inadequate for accelerated growth. The fact that stunting is exhibited by the age of two years, however, suggests that nutritional deficits alone cannot explain the extreme short stature of Ura Ayllu children.

Unlike stature, the energy intake of toddlers is not correlated with economic status. The lack of correlation makes it difficult to explain toddler stunting. It is possible, however, that toddlers of poorer households are at more risk of caloric deficits at times of the year that were not measured in this study or during earlier years, when agricultural production was not as good. This finding also may suggest that factors other than nutrition are influencing differential toddler growth among economic strata. Women of poorer economic status may give birth to lower weight infants than women from wealthier households

and the low birth weight infants may not be able to catch up in growth by this age. Illnesses such as diarrhea, which interferes with nutrient absorption and may reduce growth, may occur in children of poorer households more frequently than in children of wealthier households. By the time children reach the ages of four-to-six years, however, the data suggest that economic status is not sufficient to explain the variability in linear growth.

Remaining Questions about Diet and Growth

The nutritional analyses indicate that young Ura Ayllu children have adequate energy intake for most of the year. In contrast to the findings from other dietary studies in the Andes as well as the discourse on food and hunger discussed below, this research indicates that toddlers experience energy deficits at the time of the year when food is most plentiful. When food is more scarce, during the pre-harvest months, children's energy consumption is adequate. This finding may be because mothers are differentially feeding them to compensate for the shortages. Future analyses of these data will examine this issue by comparing young children's intakes to those of older children.

The reasons for the post-harvest energy decline among toddlers are not entirely clear. This finding does suggest, however, that food availability alone does not guarantee adequate diets. The fact that toddlers experience energy

deficits when food is plentiful indicates that food consumption may be affected by other factors such as changes in timing or structure of meals, and incidence of illnesses that affect appetite and nutrient absorption.

In regard to the pre-harvest findings, it is possible that the pre-harvest dietary survey did not capture the full extent of scarcity. The last two months of the rainy, pre-harvest season (January and February) are perceived by women to be the most difficult; thus, the intake data gathered at the beginning of the rainy season, in November and December, may not reflect the most depressed intakes which would occur a month or two later. People also were embarrassed to be observed at this time and, therefore, may have taken extraordinary measures to disguise their deprivation.

And finally, the analyses indicate that the relationship of economic status to diet and growth is not straightforward. This finding may suggest that there is not a direct correlation between economic status and dietary intake. High food security may not be a direct correlate of high economic status. Lower status households may have other strategies that enable them to maintain adequate nutrition. For example, DeWalt et al. (1980) found in a dietary study in a rural Mexican community that households in the middle economic groups appear to be at greater nutritional risk than those of the lower and higher groups because their expenditures are used less for nutritional foodstuffs than for material goods. As stated above, it is

also possible that economic status in Ura Ayllu does not vary widely enough to warrant stratification into three group, or that the ranking used in this study is inadequate to explain variability in diet and growth. Future analyses of these data will continue to unravel the complex relationship of diet, growth, and economic status.

Seasonal Hunger

Dietary and anthropometric data are the biological expressions of the phenomenon of deprivation, that also has a personal and cultural dimension. The second part of the dissertation focuses on seasonal hunger and its relationship to child feeding practices. This research illustrates that seasonal hunger cannot be defined strictly in biological terms such as nutrient intakes, growth stunting, or hunger drives. Hunger is also a product of cultural and economic factors that impinge on a household's ability to satisfy its needs. The ethnographic analysis of seasonal hunger among Ura Ayllu children supports Ogbu's definition of seasonal hunger as the "period when the resources available do not permit people to satisfy their hunger in the way prescribed by their culture" (1973:317).

The quantitative analyses discussed above indicate that the diets of Ura Ayllu children are calorically adequate at this time of the year. Indeed, young children are not dying of starvation and rarely exhibit clinical signs of severe malnutrition. Although children are quite small for their

age, it appears that dietary deficits play only a partial role in explaining children's slow growth. Genetic and environmental factors such as hypoxia also appear to contribute to the growth patterns observed among highland children.

Life is not easy, however, for young Ura Ayllu children; almost one in four children die before they reach the age of one, and many more die before the age of five. Many children have chronic diarrhea and intestinal worms, conditions which can interfere with nutrient absorption and lead to malnutrition and further infection. The high frequencies of early-life illnesses and mortality do not go unnoticed by Ura Ayllu parents. Early childhood is perceived by Ura Aylliños as an extremely precarious phase of life and parents attempt to protect their children from the stressors that can jeopardize child health. Hunger is one of these stressors and mothers make conscious efforts to shield their children from the experience.

In general, people perceive themselves as big eaters, in contrast to mistis (mestizos) and gringos ("foreigners") who are thought to eat less.[1] Mothers are conscious of their children's appetites and are able to differentiate between those who eat sparingly and those who enjoy eating. People also see their diet in very practical terms: when

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[1] There is a connection between food and strength. Work done by gringos and mistis is considered much less strenuous than the agricultural work performed by the comuneros.

there is a lot of food, they eat more; when there is little food, they eat less.

Ura Aylliños divide the year into two seasons, dry and rainy. The terms used to describe these two seasons, chiraw tiempo and paray tiempo, also signify the cyclical periods of food abundance and food scarcity in the community. These seasons are marked by differences in weather, population size, diet and food consumption, and the pace and nature of work.

The height of the dry season (chiraw tiempo) occurs during the months of June through August and is the time of food abundance. By this point of the year the harvests are complete and household food larders are full. The men and adolescent boys who spent the previous five months mining in Maldonado have returned, physically spent and exhausted, to the community where they will remain until November or December. They bring with them cash and food supplies purchased in the market town of Juliaca.

Women stated repeatedly that they cooked more frequently and more elaborate meals when their husbands were present, although my dietary surveys do not indicate increases in energy intake. Women claim that men need to eat extra food when they return to Ura Ayllu to make up for their hard work and less adequate rice based diet in Maldonado.[2] During these months, women do cater

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[2] Men consider the post-harvest months as "rest" even though they are busy working in the fields, making home

occasionally to their husband's requests. For example, meals like segundo, a dish customarily eaten at the mines and in restaurants along the road, may be prepared.[3] Most men, however, return to their homes to find respite from the monotonous Maldonado diet. They savor the soups and boiled potatoes and oca, and eschew the flavorless rice that has been sustaining them for the last several months. Indeed, Ura Ayllu food is one the things that men claim they miss the most when working in Maldonado.

During both the harvest and post-harvest seasons, extra amounts of wayk'u (steamed tubers) are prepared at meals so children will have leftovers to eat during the day. The pot of tubers is left inside the kitchen and children are not discouraged from snacking whenever they want. Although adults do not tend to eat between meals, it is considered normal and healthy for children to do so. Thus, throughout the dry season, children generally have access to food throughout the day.

The scenario of abundance changes dramatically during the rainy pre-harvest season, paray tiempo, when the new crops are growing and the larders of the previous year's crops are quickly diminishing. Men and adolescent boys begin to leave the community in November for the gold mines in Maldonado and often use the last household reserves of

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repairs, and assisting neighbors and relatives with their work.

[3] A central ingredient of a segundo is boiled rice; it is decribed in more detail in Chapter Two.

cash to finance the long and arduous journey. Faced with shortages of cash and food, the remaining household members must "tighten their stomachs" and await the fresh fruits of the next harvest season. It is during this period that women claim children feel more hunger and need to eat more food than at other times. Children's increased hunger occurs, women point out, exactly at the time when food is scarce. Paray tiempo is, therefore, a time of anxiety for both children and women.

All Ura Ayllu households experience the annual ebb and flow of food resources in accordance with the agricultural cycle. For some households, however, the pre-harvest season is more severe than the "normal" ebb of resources. This period of crisis is referred to as halaykuy and is the time when food larders and cash supplies are largely depleted. Heavy rains restrict activities and make agricultural work and the collection of cooking fuels difficult. To save on fuels, many women stated that they cooked simpler meals and more quickly than they do at other times of the year. School-age children, who are on vacation, are bored by the lack of distractions and the irregularity of agricultural work and often remain close to home. Without school and work to structure the day, women say that it is easy to lose track of time and that days during the rainy season can seem very long when surrounded by hungry and complaining children.

Faced with limited supplies of food and cash, women must adjust the diet in accordance with the kinds of food available. The most significant change in regard to children's diet is related to the absence of their favorite food--tubers, especially potatoes--in the household larder. The scarcity of tubers also means that wayk'u is no longer prepared; thus, the between-meal consumption of tubers is no longer possible. Limited cash supplies also inhibit a mother's ability to purchase foods, such as bread, that could replace potatoes as between meal snacks. Young children who do not understand the crisis continue to ask and cry for food their mothers are unable to provide. Although the dietary analyses indicate that children's caloric intake is adequate at this time, the ethnographic data suggest that the diet does not fulfill Ura Ayllu nutritional standards.

Seasonal hunger has a psychological dimension as well. The combination of inclement weather, restricted work activities, depleted food and cash reserves, and children's anxiety cause a considerable amount of psychological distress for women. Mothers, who try to appease children's hunger as best they can, often feel powerless to feed the children in the ways they believe they should. At this time of the year, household members are trying to manage food and cash shortages while monitoring the growth of the next year's crop. Weather conditions are watched carefully as too much or too little rain can have disastrous effects on

the productivity of the growing plants. The crying and whining of small children only adds to the overall feeling of anxiety that mothers feel at this time. Maternal emotional distress, therefore, is another consequence of seasonal hunger in Ura Ayllu.

Discussion

In Ura Ayllu, seasonal hunger is something people worry and talk about. Hunger can be seen as both a physiological response to a lack of food as well as a cultural response to food insecurity. While the physiological hunger which children are said to experience during paray tiempo is real, the analyses of both the quantitative and qualitative data suggest that children's hunger is created less by nutritional deficits than by economic factors which constrain parental ability to satisfy children's hunger according to the cultural guidelines prescribed for child health.

A cultural definition of hunger, however, does not negate the fact that people may feel hungry and exhibit physical symptoms such as anxiety, changes in temperament, and lethargy.[4] Mothers state that children eat less and feel hungrier during the rainy pre-harvest season than they do at other times of the year. Children, as well as mothers, also exhibit the symptoms listed above. The aim of this research is not to document whether or not children are

[4] Under these conditions, young children might lose weight even if energy intakes appear sufficient.

actually hungry, but to understand why and how this period of food stress affects them.

The analysis of the hunger season illustrates three main points. One, seasonal hunger is a multi-dimensional, intensifying sequence of events that constrain a household's ability to provide food in culturally appropriate ways. Seasonal hunger has multiple causes including but not restricted to production deficits. As stated above, changes in weather, work, and food consumption patterns all are important in explaining the creation of the crisis and household insecurity. The consequences of paray tiempo are also multiple. The psychological stress experienced by women and children illustrates the emotional dimensions which are typically overlooked in studies that focus on the physical manifestations of malnutrition and hunger.

Two, this research also demonstrates that children's diet is influenced by a number of factors: food availability, cultural guidelines for child feeding, and household economics. Women in Ura Ayllu recognize the vulnerability and special needs of their small children and protect children from hunger by providing food. This research suggests that children's needs are not subordinated to those of other household members. In fact, much of the stress that women feel at this time is a result of their inability to fully remedy children's anxiety. The data suggest that in times of food shortage one might expect to see dietary inadequacies among older household members but

not young children. Thus, young Ura Ayllu children do not appear to be socially discriminated against when food resources are constrained.

The availability of food resources does affect household diets and the scarcity of specific crops plays an especially significant role in defining seasonal hunger in Ura Ayllu. Potatoes and oca represent the core foods in this community. People spend a great deal of time not only cultivating them but also talking about them. Each variety is named and valued for its particular characteristics and culinary uses. Potatoes appropriate for wayk'u are kept separate from those for soup and are not used interchangeably. Indeed, a meal without some amount of fresh or dried potato or oca is hardly considered a meal.

The social meanings and values attached to potatoes and oca become even more apparent when they are scarce. Ideally, the yearly harvests of potatoes should overlap. In practice, however, only some households have supplies of the valued "old" potatoes (papa awila) when the new harvest begins. Children, in particular, are affected by the seasonal scarcity because potatoes and oca are no longer available for eating throughout the day. I suggest that fresh tubers symbolize the well-being and security of a household, and that their gradual disappearance from daily use during paray tiempo signals a household's downward slide toward economic uncertainty and the anticipation of hunger. Thus, the scarcity of potatoes has implications not only for

dietary adequacy and the economic status of the household, but for the sensation of hunger as well.

And third, the experience of seasonal hunger is not a universal one among all Ura Ayllu households. During my research, it was clear that some households were struggling to meet their needs while others were continuing to enjoy potatoes from the previous harvest. The inter-household difference was not as obvious during the harvest and post-harvest dietary surveys, but was quite striking during the rainy season.

In poor rural communities like Ura Ayllu it is often difficult for an outsider to detect economic variability among households. Ura Aylliños themselves recognize economic differences within the community, as evidenced by the statement of one informant "we are not equal." Through this study of diet and hunger, interhousehold differences do emerge. It appears that some households are better able to even out the annual fluctuations in food supplies than others. Wealthier families may have more landholdings and more reliable sources of cash income than poorer families and these allow the households to better manage the hunger season. Although dietary intake does not suggest a strong and consistent relationship with economic status, it is possible that poorer households have developed strategies to ensure an adequate diet in the short run but that may lead to further impoverishment over time. Even strategies like the removal, prior to planting, of seed potatoes for

consumption purposes may have an effect on agricultural productivity over time.

The dietary patterns observed in Ura Ayllu also suggest that we examine the relationship between subsistence agriculture and labor migration more carefully (see Collins 1988). In general, agriculture in Ura Ayllu cannot support households over the course of the year. When stores of local foods, in particular fresh tubers, become scarce, purchased grain products take their place in the diet and assume primary importance in terms of calories. While it seems clear that cash incomes are necessary to carry a household through the year, it is less clear what effect seasonal out-migration has on agricultural production and, as a result, the diet.

On the one hand, it appears that cash incomes serve, in part, to fulfill food needs that cannot be met under current conditions. For example, increased population size, limited land availability, or decreased or limited agricultural productivity may act alone or in concert to reduce the food available for consumption. On the other hand, seasonal migration may siphon off labor needed for agricultural work, thereby decreasing total production, and may ultimately increase the need for cash to purchase foods.

Of Ura Aylliños who work in the placer mines, the majority leave in November and December. The timing of their departure coincides with the period of the year when food supplies and labor demands are at their lowest.

Therefore, the absence of some household members may be seen as an advantage. The absence of these household members, however, continues well into the harvest season (April or May) and may possibly affect food production over time.

Before the "gold rush" reached current levels of intensity in the latter half of the 1970s, Ura Aylliños travelled to the montaña region within Sandia province during the dry season and spent less time mining for gold. It is unclear whether seasonal food crises might have been even more severe in the recent past when entire families would be present in the community during paray tiempo or whether current levels of food insecurity has been exacerbated with the annual loss of labor.

Whether current dietary patterns are, in part, a response to, or cause of, seasonal migration cannot be determined with the data at hand. The data do suggest, however, the importance of examining what effects labor migration has on subsistence agriculture and, ultimately, on the diet and well-being of farming households in Ura Ayllu.

Conclusions

This research examined the multiple dimensions of malnutrition and seasonal hunger among young peasant children. Studies of seasonality have advanced our knowledge of rural communities in less-developed countries like Peru by showing that livelihoods are not static.

Despite the long-standing tradition in anthropology to study and document change over time, it is only within the last decade that seasonality became a central topic of examination. The fact that rural households must contend with intra-annual and year-to-year fluctuations in food supply, wage employment, and market prices also has important methodological implications.

The present study of seasonality and nutrition examined changes over the course of one annual cycle. While this research did find seasonal variability in the diet, a survey of one year may be inadequate to examine the full extent of seasonality and people's responses to fluctuating food resources. An investigation of longer duration than a single year would allow a researcher to examine variation between good years and bad and to evaluate the costs of coping strategies to long-term economic and food security.

The study of seasonal hunger showed that Ura Aylliños have strategies for dealing with food shortages. A number of questions emerge from this study that have implications for long-term economic security. For example, does the consumption of small amounts of seed potatoes or the periodic early harvesting of small amounts of immature crops have a significant impact on agricultural production over the long run? How do production shortfalls one year affect food budgeting and planning the following year? Are there ways for individuals and households to catch up after a bad year? Is there a time threshold beyond which individuals

and households are no longer able to recuperate? These questions would best be addressed by studies that follow households over the span of several years.

Nutritional research has shown that the quality and quantity of diets vary over time and have differential effects on individual household members. Young children's exposure to nutritional risk is thought to be greatest in the hungry season when food and cash resources are scarce (Lipton 1987; McLean 1987). Nutritional risk, defined by McLean (1987:393) as "the chance of death, ill health, malfunction, poor achievement in body size, or hunger due to insuffient food," results from the interaction of several events and is rarely constant over space and time (ibid.) The present study shows that Ura Ayllu mothers also believe that food shortages associated with the rainy season put their children at risk of ill health and hunger. Women's discourse reveals that the rainy pre-harvest season is viewed as distinct from other times of the year. Conditions of weather, food supply, and household economy make this season as a precarious time for young children especially. Women see children's dietary adequacy and health status as related to but distinct from other household members. Young children are thought to be especially vulnerable to hunger, and these concepts are in line with those of general health maintenance in the community.

In Ura Ayllu, an adequate diet is seen as integral to good health. Health is maintained in part by the

consumption of foods that are classified by their inherent qualities in the dimensions of hot and cold, and wet and dry. An inability to provide and combine foods in appropriate ways jeopardizes health. This is particularly true for young children who are thought to be especially vulnerable to hunger as well as to other causes of ill health. People say that one learns how to cope with hunger, but that young children have not reached a stage of development when they can understand and deal with the deprivation of food.

The results of quantitative analyses indicate that seasonal changes in food availability affect on the caloric adequacy of the diet less than the kinds of foods eaten. During the post-harvest season children are shown to have calorically deficient diets in spite of abundant food supplies. The opposite is found during the rainy pre-harvest season when their diets are adequate. Thus, the availability of food resources does not necessarily guarantee an adequate diet among children nor does an adequate diet necessarily signify a lack of hunger in the community. These results suggest that factors other than food supply may put children at nutritional risk.

These findings emphasize two main points. One, Ura Ayllu mothers are partially successful in buffering their children from the seasonal changes in food supply that affect the household diet during the rainy season. The fact that children's diets are adequate calorically during the

rainy season is a result of maternal efforts to protect children from hunger and ill health. Although diets are adequate from nutritional and biomedical perspectives, they may be deficient from an Ura Ayllu perspective. Women's discourse indicates that their attempts to shield children from hunger are not always as successful as women would like them to be. Shortages of food and cash to buy food limit some women's ability to provision children in culturally appropriate ways.

Two, this study shows that hunger is not strictly related to absence of food or physiological discomfort, although those dimensions are present. Hunger is also related to insecurity and economic stress within the household that in turn limit the availability and choice of food. This has implications for the ways in which researchers conceptualize and measure hunger. In an impoverished community like Ura Ayllu, levels of food consumption alone may be insufficient to express the meaning of hunger among children. People have their own definition of hunger that has to do with following cultural guidelines for good health. Seasonal changes in the kinds of foods eaten may jeopardize the quality of the diet, according to local standards, which put children at health risk.

This research also has implications for the involvement of malnutrition in child morbidity and mortality. The interaction of severe malnutrition and infection plays a major role in the high rates of mortality in children less

than five years of age in many less developed countries. The dietary and anthropometric data suggest that Ura Ayllu children experience mild to moderate degrees of nutritional risk as evident in growth deficits but do not exhibit signs of severe clinical malnutrition (e.g., edema and changes in hair and skin [Scrimshaw and Young 1989]). Although children's diets appear to be calorically adequate for much of the year, their growth is significantly stunted, suggesting chronic malnutrition. This finding suggests that factors other than seasonal nutrient deficiencies may be influencing growth in Ura Ayllu.

One of these factors may be infectious disease. The interaction of malnutrition at mild to moderate levels and infectious disease has been explored by a number of scholars (see Scrimshaw et al. 1968; Leslie 1987; Martorell 1984; Mata 1978). In communities like Ura Ayllu, young children experience recurring bouts of infectious diseases (e.g., diarrhea and lower respiratory tract infections). Diarrhea, in particular, has been shown to cause malnutrition by suppressing appetite and interfering with nutrient metabolism and absorption (Leslie 1987).[5] In turn, malnutrition may increase the risk of infection or the severity and duration once it has begun (ibid.). This vicious cycle of recurring interaction of diarrhea, malnutrition and lower repiratory tract infection has been

[5] Diarrhea has a significant negative effect on child growth (substantial height and weight deficits) among preschool children (Leslie 1987).

identified as a synergistic triad that puts children in a downward spiral toward death (Wray and Aguirre 1069).

Childhood diarrhea is a problem in Ura Ayllu. Although the present study did not specifically measure the incidence or duration of infectious diseases causing diarrhea, my observations and conversations indicate that diarrhea is common among young children. This suggests that the relationship of infection to adequate food intake may have be significant and negative regarding the nutritional status of Ura Ayllu children, as indicated by deficits in height and weight. The interaction of malnutrition and infection is an issue that merits further investigation. Future research may examine whether there are seasonal patterns of infectious illnesses in Ura Ayllu and how they may affect the nutritional status of young children.

Researchers have generally located child health and nutrition issues primarily within the domestic unit. Although poverty is cited often as the ultimate cause of malnutrition (e.g., Huffman 1987; McLean 1987; Millard et al. 1989), nutritional research and intervention programs have focused much of their attention on the individual child or the mother-child dyad. The focus on the mother-child dyad often places the blame on mothers for the nutritional and health problems seen in their children. The findings of my study show that while mothers are the primary food providers to children, they are not always in a position to act as they would like. My research is in agreement with

others that state that much of the blame is misplaced because women must act within economic contraints that limit their ability to provide adequate care and food (Scheper-Hughes 1987a; Van Esterick 1989). My research shows that attention needs to focus simultaneously on both the level of the individual within the household as well as on the structural location of the household within society.

As a result of this focus on the domestic unit, inadequate or inappropriate child care and feeding practices often are implicated as indirect causes of child malnutrition or mortality (Cassidy 1980; Huffman 1987; Martorell 1985; Scrimshaw 1978). The causes of inadequate care are centered on parents' lack of understanding of their children's needs as well as an adherence to cultural beliefs that inadvertently put children's health at risk. The depictions of inadequate feeding practices tend to portray parents as unaware actors in regard to their children's welfare. Furthermore, the tendency to dichotomize child feeding practices as adequate or inadequate oversimplifies a very complex process. Indeed, children may experience ill health and malnutrition when parental intentions are "good."

The present research speaks directly to this issue. In the case of Ura Ayllu, there is parental awareness of child feeding, rearing, and health. Childhood illnesses and deaths do not go unnoticed nor are they taken lightly. Both men and women monitor the development of their children and express concern when they observe changes in health.

Transitions in food consumption in the post-weaning phase are indicative of this point. Giving their youngest children special attention, women guide children through the vulnerable early years when they are most likely to become ill or die. Although weanling children are wholly reliant on adult foods, they are not expected to conform immediately to an adult meal schedule. Recognition of a child's vulnerability is bourne out in women's behavior when food is distributed. By providing food between meals, women continue to adhere to the on-demand schedule of breastfeeding until children are able to eat like adults or older children. These findings show that not only are children's needs recognized by mothers, but that decisions on food allocation are made for their benefit.

Children also are involved in the process of food allocation. Like their parents, children are more active participants than what is suggested in the literature. Young Ura Ayllu children make their food needs and preferences known to their parents by crying, asking, or refusing to eat what is served. Children request food from their parents if they unable to get it for themselves. Youngsters that are restless during the preparation of a meal are served first, before adults and older children. Older siblings who take care of young children also are attentive to their needs.

This study also has implications for household economic models and the politics of intergenerational household

consumption. Household economic models propose a hierarchical structure whereby adults have priority over children by virtue of their economic worth or social status within the culture. The allocation of resources is viewed as a process which is dependent upon access and control of these resources. Consumption of food, as well as the outcomes of nutritional and health status, are viewed as directly related to the control of resources or one's social or economic position within the household. This assumption is the basis for the ways in which child health and nutrition problems have been analyzed for the most part. The interpretation assumes that children's interests are subordinated to those of adults. Young children do not tend to control resources; therefore their access is mediated by others, usually mothers, who care for them. This assumption does not hold in this research. In this case, children are seen as having a right to food which is not based on their economic or productive status.

Caldwell's work on wealth flows within the household economy emphasizes the economic rationality of parental investment in children (1982).[6] In his approach, high fertility is economically rational because of the expectation that children will be crucial to parental well-being over the long run. The present analysis shows, however, that the economic value of children is not the only

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[6] Wealth is defined by Caldwell in terms of resources, services, and responsibilities (1982:333).

reason people feed and care for children. Although children are seen as future workers who will contribute to household resources, this anticipation does not lead to a straightforward calculation of utility or what the child's labor will be worth. In Ura Ayllu, there is an inherent value of children in nonmaterial aspects. For example, an important part of becoming an adult is having children. Couples unable to bear children will take care of or adopt a child, who is seen as completing the household rather than as a future worker requiring investment. Furthermore, because agricultural production does not rise in parallel with increasing numbers of children in households, people do not see large families as intrinsically advantageous; large families with many young children may be seen as economically disadvantaged. Family life cycle issues and economic differences among families have a bearing on the extent of economic shortage when children are young and how productive they can be when they start to work. Thus, people do not bear children specifically for the economic benefit they will eventually provide.

In conclusion, the present study examined child nutrition in relation to seasonal changes in food availability and to parental behavior and food allocation within the household. High rates of morbidity and mortality among children under the age of five in less developed countries have led researchers to conclude that children do not figure prominently in food allocation decisions. By

looking within the context of the household, the locus of food consumption in Ura Ayllu, this study examined parents' views of children and the implications of these views for food allocation and child health. The findings suggest that parents are aware of the forces impinging on their children's welfare and act to safeguard them.

By focusing the analysis on young children, this research points out inadequacies in how children are represented in the literature. Despite the tremendous amount of interest among researchers and international health agencies in improving the health and survival of young children, there is a tendency to see children as a social category and to overlook children and their parents as reflexive social actors. Children's dependence on adults does not necessarily imply that their interests are secondary to those adults. This study suggests that future research explore the relationship of child malnutrition to the politics of food allocation and household economy. This line of inquiry would require a reexamination of assumptions about children's status within the household and the presumed subordination of their interests to those of adults.

APPENDIX A

APPENDIX A

Table A.1

Ura Ayllu Food Composition Sources

Code No.[a]	Food Item	Source[b]
	Milk and milk products	
101	cheese, fresh (goat)	I:667
102	cheese, fresh (cow)	P:006
103	milk, canned, evaporated	I:678
104	milk, fresh (cow)	I:672
	Eggs	
105	eggs, de gallina, (granja)	B:3,1
106	eggs, de gallina, yolk	B:3,1
	Meats	
107	beef fat (cebo)	B:3:9
108	cuy meat	P:027
109	mutton, very thin	I:571
110	sheep foot,boiled	P:020
111	alpaca meat	A:p.161
112	charqui	P:048
113	pig's foot	I:541
	Cereals and grains	
114	rice, raw	P:120
115	oatmeal	P:122
116	barley, peeled (cebada)	B:1,3
117	noodles	P:133
118	noodles, spaghetti	P:134
119	corn, alazán (red-brown)	P:138
120	corn, yellow	P:141
121	corn, avg 119 & 120	
122	corn, cancha (tostado)	P:142
123	corn, chochoqa	P:143
124	corn on cob, choclo	P:144

Table A.1 continued

125	corn, mote	P:150
126	cornmeal (polenta)	U:883
127	wheat flour	P:173
128	trigo, chancado (chaquepa)	P:175
129	bread (farm)	P:155
130	sweet bread, bizcocho	B:2,22
131	crackers (soda)	P:136
	Legumes	
132	peas, fresh	P:179
133	peas, dried	P:180
134	habas, dried with skin	I:469
135	habas, dried without skin	P:222
136	habas, fresh	P:223
137	habas, tostado	I:470
	Vegetables	
138	collards, leaf	I:128
139	onion, leaves and stems	I:187
140	onion, red	B:1,13
141	onion, green, whole	U:1415
142	garlic	P:247
143	Swiss chard	P:235
144	lettuce, leaf	U:1259
145	nabo	P:293
146	carrots	P:315
147	zapallo	I:254
148	aji (Capsicum frutescens L.)	P:237
	Tubers and roots	
149	racacha	P:320
150	chuño	P:327
151	chuño negro	P:328
152	llacon	P:332
153	isaño	P:333
154	oca	P:334
155	ccaya	P:335
156	olluco	P:336
157	potato, ave. of yellow and white	P:337 P:338
158	potato, flour	P:339
159	potato, frozen	P:340
160	potato, boiled in skin	U:1787
161	potato, boiled, pared	U:1788
162	potato, without peel	I:216
163	papa japonesa/pituca	P:343

Table A.1 continued

	Fruit	
164	avocado	P:402
165	orange	P:396
166	orange peel	U:1440
167	lime (limon)	U:1260
168	tangerines	P:387
169	plantain, green	P:423
170	plaintain, green, boiled	P:425
171	peaches, green	P:356
	Herbs	
172	hierbabuena (Mentha piperita L.) muña, dry (Minthostachys mollis) toronjil (Melissa officinalis L)	P:280
173	huacatay (Tagetes minuta) manzanilla (Matricaria chamomilla)	P:282
174	chiqchipa(Tagetes multiflora HBK)	P:271
175	perejil (Petroselinum sativum)	P:301
176	hinojo (Foeniculum vulgaris)	U:1000
177	karikari, berry (Rubus roseus)	I:312
178	oregano (Origanum vulgare L.)	P:295
179	watercress	P:252
180	porro (Allium porrum)	P:304
	Condiments and other foods	
181	salt, table	U:1963
182	sugar, rubia	P:446
183	sugar, white	I:522
184	coffee, roasted	I:710
185	achiote (anatto)	I:706
186	sweet chocolate, powder	U:586
187	pure cocoa	P:230
188	veg. oil	I:687
189	phasa (ch'aq'o)	B:1,22
190	oregano, seco	USp:027
191	ccaya, remoj (avg154,155)	
192	blank	
193	sheep head	P:16
194	noodles, unenrich,ckd	U:1380

Table A.1 continued

[a] Code numbers used in the Lotus nutrient analysis program.
[b] Source codes refer to the source document (A, B, I, P, U, USp) and reference number (or page number, in the cases of A and B) of the food item in that document.
A: Antúnez de Mayolo R., S. E., 1981
B: Ministerio de Previsión Social y Salud Pública (Bolivia), 1979
I: Wu Leung, Woot-Tsuen and Marina Flores, 1961
P: Collazos, Carlos, et.al., 1975
U: Watt, B.K. and A.L. Merrill, 1975
USp: USDA, 1977 (Spices and Herbs)
Complete references are provided in the bibliography.

Notes: Umbelliferae: perejil, hinojo
Labiatae: hierbabuena, muña, toronjil
Compositae: wakatay, chiqchipa, manzanilla
Sources: Gade 1975; Girault 1984

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