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REACQUIRING A TASTE FOR DIVERSITY: CHANGING FOOD HABITS, THEIR CAUSAL FACTORS, AND THE VALUE OF DIETARY DIVERSITY IN JUMLA, NEPAL

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ABSTRACT

Understanding local food systems including food habit changes and the factors contributing to these changes is critical to ensuring effective interventions of food security. While diversity of foods is widely recognized as an important aspect of sustainable diets and food security, the value people place on dietary diversity is rarely considered in local interventions. In the remote, high-hill district of Jumla in Nepal, diversity is particularly important for food security. Despite this, many people choose to eat the same meal of *dalbhat* twice a day, leaving to question the value they have for dietary diversity. This has implications for the interventions used by policymakers and practitioners to address issues of food insecurity. This study examines community-perceived food habit changes and the factors contributing to these changes in Jumla, in addition to the value people place on dietary diversity. A participatory research approach employing eight focus group discussions was used to elicit and examine community perceptions. A variety of causal factors were cited as responsible for changes in both consumption and production of food over the past sixty years, particularly the onset of pests and diseases, the effects of climate change, and food aid. While access and availability pose major barriers to dietary diversity in Jumla, persistent food habits were found to underlie consumption patterns. It is therefore necessary that the production and markets for local foods are enhanced, development and food security are planned collectively, and new cooking methods and recipes are promoted to enable people to *reacquire a taste for diversity*.

INTRODUCTION

Biodiversity is important in managing the goods and services that people need (e.g. food), contributing to ecosystem services (e.g. pollination, control of greenhouse gas emissions and soil dynamics) and for social, cultural and conservation benefits (Frison, Cherfas & Hodgkin, 2011; Johns & Sthapit, 2004). Diversity within a food system exists in several different forms, each with their own importance to food security. Crop diversity and genetic diversity (within crops) are important in boosting productivity (as has been found in home gardens), reducing the risk of crop failure in high stress environments, enhancing resistance to outbreaks of pests and diseases, regulating and supporting ecosystem services (e.g. enhancing pollinator availability) and improving adaptability and resilience to climate change (Frison, Cherfas & Hodgkin, 2011).

Dietary diversity is another crucial aspect of diversity in food systems which contribute to food security. Consumption of a diversity of foods is believed to contribute to better nutrition and health through the supply of micronutrients and other important components such as fibre (Frison, Cherfas&Hodgkin, 2011, p. 245). Dietary diversity has been linked to child development through reducing stunting and malnutrition(Arimond&Ruel, 2004), improving childhood survival in developing countries (Pelletier &Frongillo, 2003) and having a direct positive impact on economic productivity when children become adults (Hoddinott, Maluccio, Behrman, Flores, &Martorell, 2008). Furthermore, there is some evidence that dietary diversity reduces disease, morbidity and mortality (Frison, Smith, Johns, Cherfas, &Eyzaguirre, 2006).The importance of a diversity of foods to maintain a healthy and active living, or food security, is one of the most longstanding and universally accepted recommendations for human health both at the global, regional and local levels (Burlingame &Denini, 2010; FAO, 1996; FAO 2012; Hatloy, Hallund, Diarra, &Oshaug, 2000; WHO (Europe), 2003; UK Food Standards Agency, 2009). Diversity in the food system is particularly important for rural and remote populations, which are largely dependent on subsistence farming and where access to diverse foods through market imports is often limited and the impact of climate fluctuations are hard to predict.Consumption and production patterns however, are shaped by a variety of ever-changing environmental, social, and economic factors.

This study is based in the District of Jumla, in the Mid-Western Development Region of Nepal. Located in the high-hills, where air and road accessibility are irregular and dependent on the weather, and farming is largely subsistence based. Jumla is ranked 64th out of 75 districts in its HDI (Human Development Index) score. Over half of the children under five are malnourished and life expectancies (of 63.14 years) are among the lowest in the country (Government of Nepal & UNDP, 2014).Due to its challenging and remote environment, this area has been the subject of previous studies including those by Bishop (1990) and Whiteman (1985) which explore livelihood strategies and crop productivity, respectively. However, socioeconomic development in Jumla is increasing. The recent construction of the Karnali Highway, connecting various VDCs in Jumla to Surkhet, a regional hub, has brought significant changes to the accessibility of imported foods in the region, thereby influencing local food systems. As a result of challenges in accessing chemical fertilizers and herbicides, and in an effort to find a niche market for the national export of foods produced in Jumla, the District Agriculture Development Office (DADO, a government agriculture extension service office), declared Jumla an organic district in 2007, bringing further changes to local production systems (Rajbhandari, 2010). Various other development initiatives, as well as reported impacts of climate change, have contributed to changing food habits in Jumla.As numerous studies have indicated, understanding changing food habits and the factors influencing food habit changes is crucial to enhancing the ideas, goals, and policies for ensuring food security (FOODSECURE, 2013; Lentz, 1999). These studies however, seldom consider community-perspectives on food systems, which are critical to understanding the status and role of local food systems in enhancing community food security. Community-sourced information is a crucial means of shedding light on people's knowledge and awareness of food security and sustainable diets and the corresponding gaps in information or social stigmas surrounding food systems (necessary for appropriate interventions). It also highlights which factors community members consider to be most significant in impacting their food habits.

Picture 1: Barley fields rotate with rice crops along the road from Chandannath to Talium



Equally important to food security is dietary diversity, which “...reflects household access to a variety of foods, and is also a proxy for nutrient adequacy...” (FAO, 2013). In many areas of Nepal, regardless of affluence or access to a diverse variety of foods, *dalbhattarkari*, or simply *dalbhat*, a meal consisting of plain, boiled rice (*bhat*), and small sides of lentils or pulses made into a soup (*dal*), and vegetables cooked as a curry or simply stir-fried (*tarkari*), is consumed twice a day with snacks (“*khaaja*”) consumed around these meals. While previous studies have found that rising incomes lead to the diversification of diets away from the traditional dominance of rice (FAO, 2004), this is not the case in Jumla, where rising incomes seem to have corresponded with a greater consumption of rice. This brings into question the value people place on dietary diversity. Previous studies have found that despite access to a diverse variety of foods, people may choose to base their diet on one “simple but perfect meal” (Lentz, 1999). As Lentz explains, “It seems to be this satisfaction with, and even pride in, the indigenous simple but perfect meal that accounts for the amazing persistence of food habits” (1999, p. 17). To what extent then, does the desire for dietary diversity influence current food habits? If people do not value diversity, initiatives should be based on education and awareness, to promote both food security and sustainable diets. If they do value dietary diversity then it is important to understand, why they are not consuming a greater variety of foods? Understanding people’s value for dietary diversity is consequently a major gap in previous literature on food security. Therefore, this study contributes to food security knowledge and initiatives, through identifying and documenting community-perceived food habit changes, and their causal factors, and understanding the value people place on dietary diversity.

PURPOSE AND OBJECTIVES

The purpose of this paper is to identify and document food habit changes and the causes of these changes in Jumla, Nepal, as depicted by community members, and to determine their value for dietary diversity. Specific objectives include:

1. To describe the existing food habits and changes to them as perceived by community members
2. To identify and document key causal factors behind food habits and changes
3. To assess the community perception and value of dietary diversity

REVIEW OF LITERATURE

Food Habit Changes:

Much of the literature on food habit changes relates to dietary changes experienced by immigrants (Rosenmöller, Gasevic, Seidell & Lear, 2011; Wandel, Råberga, Kumarb, & Holmboe-Ottesenb, 2008), changes associated with life stages, such as childhood, marriage, and menstruation (Bove, Sobal, & Rauschenbach, 2003; Bryant, Truesdale & Dye, 2006; St-Onge, Keller, & Heymsfield, 2003), and changes experienced by people under specific conditions such as smoking (Dallongeville, Marécaux, Fruchart, & Amouyel, 1998) and illness (Ikeda, Brown, Holland, Fukuhara, & Hodges, 2002). Many studies link dietary changes with nutrition, as in cases of obesity (Agostoni et al, 2011; Popkin, Adair, & Ng, 2013), and with climate changes (Lobell et al, 2008; Shindell et al, 2012).

Studies of food habits in developing countries typically are in reference to global food movements and case study comparisons (e.g. Brouwer, 2006; Den Hartog, van Staveren & Lentz, 1999). In literature specifically focused on Nepal, emphasis has been placed on the impact of environmental changes on food systems (Bista, Amgain & Shrestha, 2013; CGIAR, 2013), nutritional studies (Abhishek, Ashish & Faujdar, 2014), and food security assessments (FAO, 2010; Oxfam, 2011) rather than on the documentation of changing food habits. Changing food habits can include where foods are purchased and eaten, attitudes towards specific foods, tastes, and the effects of marketing. Globally these changes are leading towards more homogenous and less diverse diets (Fanzo, Cogill & Mattei, 2012, p. 2). There is a lack of literature on community-depicted food habit change.

CAUSAL FACTORS CONTRIBUTING TO FOOD HABIT CHANGES

Literature on the causal factors of food habit changes either discuss general, global drivers of change, such as changes in demographics, economics, sociopolitical context, cultural context and science and technology (Ericksen, 2007), or more specific causal factors of changing food habits, which are particularly prominent in the media, such as high food prices (The World Bank, 2013) and climate change (Schmidhuber & Tubiello, 2007). Other studies have focused on future predictions of changes to food habits and their causal factors (Godfray et al, 2010).

Agricultural intensification, poverty, population pressures, urbanization and lifestyle changes are recognized as substantial contributors to changing food systems (Fanzo, Cogill & Mattei, 2012), however much less is known about what influences food consumption. Fanzo, Cogill and Mattei (2012) suggest that consumption patterns are determined by income, lifestyle, and behaviours which are influenced by culture, media, and information. There is a lack of literature based on community-identified factors contributing to food habit changes.

THE VALUE PEOPLE HAVE FOR DIETARY DIVERSITY

Very few studies have focused on the value people place on dietary diversity. Dietary diversity primarily appears in literature which explores its connection to food security, or more specifically to nutrition and socio-economic status, two important aspects of food security (FAO, 2013; IFPRI, 2002; Rijal, 2010). Dietary diversity has been regarded as a key feature of a healthy diet (ensuring the intake of essential nutrients) and as an important aspect

of a “sustainable diet” which has low environmental impacts and contributes towards food and nutrition security and a healthy life for future and human generations (Burlingame & Denini, 2010; Fanzo, Cogill&Mattei, 2012).

Other literature has emphasized measures of dietary diversity (Drescher, Thiele, & Mensink, 2007; Ruel, 2003), of which there are many, and none of which is standardized in practice. Two popularized ones are those put out by the Food and Agriculture Organization (FAO) of the United Nations and the USAID’s FANTA (Food and Nutrition Technical Assistance) Project, which measure dietary diversity using a Household Dietary Diversity Score (HDDS) and/or a Women’s Dietary Diversity Score (WDDS). These require household or individual surveys that document food consumption and categorize foods into nine to 12 food groups, based on nutritional value (FANTA, 2006; FAO, 2013).

While many studies have identified the value of biodiversity and genetic diversity, which often correlate with dietary diversity (Frison, Cherfas& Hodgkin, 2011; Toledo& Burlingame, 2006; Sthapit, Rana, Eyzaguirre& Jarvis, 2008), the extent to which people value dietary diversity is seldom examined. Considering the level to which dietary diversity is recognized as an important aspect of food security, the lack of information on people’s value for dietary diversity is a major gap in the literature which this paper tries to address through documenting community-identified food habit changes, their causal factors and the value that people place on dietary diversity.

Exploring changing food habits, their causal factors, and dietary diversity is particularly important in the remote district of Jumla, Nepal where people are largely dependent on subsistence farming and where access to diverse foods through market imports is often limited and the impact of climate fluctuations are hard to predict. Furthermore, socio-economic development in Jumla has typically not corresponded with increases in dietary diversity, which means that understanding the value that people place on dietary diversity is crucial to ensure adequate interventions for food security and sustainable diets.

RESEARCH METHODS

The objectives of this study were achieved through a participatory research approach (Chambers & Conway, 1992), which included eight Focus Group Discussions or FGDs (ODI, 2009) within the district of Jumla during the lean season (June, 2014), reflecting the time of year with greater food insecurity. These were held in four VDCs (Village Development Committees) in Jumla, which are the smallest administrative units of the government. Figure 5 illustrates a map of VDCs in Jumla while Table 1 depicts the details of the FGDs. The VDCs used for FGDs were selected based on LI-BIRD’s involvement in Jumla (allowing for ease of access and organization of FGDs) and for their differences in food determining traits (described in Table 1).

The first two FGDs, while contributing important information, were primarily used as preparatory discussions, to gain information on regular food customs and habits and develop appropriate questions and context for interpreting results. FGD participants were selected with the help of community members, with emphasis on including people of an older-age (to better reflect on food habit changes) and a relatively even mix of women and men (38% and 62% respectively), with the exception of the youth and women’s FGDs (see Table 1). Ideally these latter two FGDs would have been done in each VDC to allow for a greater regional comparison; however time constraints limited the scope of this study. Participant’s fell

between the ages of 20 and 77 years. Their identity remained anonymous. The vast majority of participants identified as farmers, while a lesser extent identified as restaurant and hotel owners, food vendors, or agriculture extension officers, and less than five were not directly involved in a food-based occupation but instead identified as teachers, health workers, and NGO employees. While many of the questions proposed to participants in the FGDs were the same, others were adapted to fit the context or meant to build-off or verify previous responses. This study documents food habits as described by community members.

To attain information regarding food habit changes and their causal factors, participants in each of the VDCs were asked to reflect on food-related changes, when they recall them happening, and why they believe these changes have occurred. Participants helped to construct a timeline (see Figure 2) which has been compiled in a graphic representation (see Figure 6), with the exception of the youth and women's group FGDs which were not focused on food habit changes. As is customary in Nepal, responses were given based on the Nepali calendar (the BikramSambat calendar), of which it is presently the year 2071. All dates had to be converted to the Gregorian calendar, and therefore where exact months and days could not be recalled, translated dates may be misrepresented by a corresponding calendar year to that which is recorded.

While analysis of food habit changes and the factors contributing to these changes was primarily qualitative, two tables were made to quantify this information and compare it to the qualitative responses. One table recorded all types of food mentioned in the FGDs and organized them into food groups in the column "past" or "present", depending on how that food was referenced (see Table 2). There were no precise time boundaries given for defining the "past" and the "present". When dates were supplied, those prior to the year 2000 (Gregorian calendar) were included in the "past" quantifications and those in the year 2000 and after were included in the "present". Only specific food types in reference to consumption were included. The number of food types was totalled per food group to give an indication of food habit changes and dietary diversity over time as expressed in the FGDs. While conclusions cannot be made from this table alone (as it is possible that people did not state all of the foods consumed in the past or present), this chart is useful in comparison with qualitative findings. The other table (Table 3) documents the factors contributing to food habit changes (as noted by participants), and quantifies the number of times they were stated (in relation to changing food habits) within any of the FGDs, and the number of FGDs they were cited in, which may be indicative of the causal factors which people perceive to be the most significant in contributing to food habit changes.

Figure 2: Constructing a Timeline with FGD Participants in Patmara



As previous studies measuring the value people have for dietary diversity are limited, this objective was assessed based on community responses to three aspects of diversity: current consumption patterns, food preferences, and perceptions of dietary diversity. Current consumption patterns are a primary measure of dietary diversity and can be reflective of the value people place on diversity (FANTA, 2002; FAO, 2013). Analysis of consumption patterns included food types, the number of food groups (based on five common food groups including cereals/grains, vegetables, fruits, meats/meat alternatives, and dairy and egg), and the relative proportion of food types, as is consistent with the components of dietary diversity measurements (FANTA, 2002; FAO, 2013). Beverages were not included. Rather than inquiring about consumption within a specific time period and then quantifying the results by score (as is common in formal dietary diversity analyses held at the individual and household level), acquiring this information through FGDs required questioning respondents as to the frequency of consumption of these foods, and comparing the extent to which people diversify their diets from the common Nepali diet of *dalbhat* (rice, lentils or pulses, and vegetable) twice a day, or the extent of diversification within this consumption (e.g. the types of rice, *dal*, and vegetables consumed). Table 2 supports findings of diversity in consumption patterns through quantifying food types and food groups cited by respondents. Food preferences were acquired through asking questions to participants about their “ideal” food consumption in a day and foods they would like to consume more of. Participants were later asked whether or not they think their diet is diverse, if they believe diversity is important and how they might increase diversity in their diets, to gain an understanding of perceptions of dietary diversity. It was important to ask these questions last to ensure it did not influence other responses, as participants may seek out the “right” response to the questions. In analyzing the value of diversity, participant’s perception of diversity was used as the primary indicator with current consumption patterns and food preferences used to support or comprehend the results. Discrepancies between these latter two aspects of diversity values with people’s perception of diversity may be indicative of barriers to dietary diversity (whether physical or psychological) which must be addressed to ensure food security.

FINDINGS AND DISCUSSION

Food habit changes

People are consuming more vegetables, fruits, and meats than in the past, but less dairy, and egg.

General findings from the FGDs indicate that people are consuming more vegetables, meats and fruits than they did in the past, which has been associated with “socioeconomic development” and “richer diets” (Kastnera, Rivasa, Kochc&Nonhebela, 2012, p. 6868). Greater consumption of a variety of fruits and vegetables and regular integration of animal-derived foods in one’s diet has been found to lead to better health and nutrition and thereby contribute to food security (Frison, Cherfas& Hodgkin, 2011). The introduction of new vegetable seeds and varieties, has led to the consumption of new types of vegetables, though some respondents claimed to have eaten more wild vegetables in the past which are presently too difficult to obtain (illustrated in Table 2). Consumption of local, mixed beans, primarily used in *dal*, remains an important part of people’s diets. Fruit is the least consumed of the five food groups included in this study and is largely dependent on income and access (as vendors outside of the bazaar do not sell imported fruits). Local apples (through government marketing-for-export initiatives) and plum varieties are important sources of fruit when in season.

Whereas meat was only eaten for special occasions in the past, it is now eaten monthly or weekly, depending on people’s income, as many reported the high prices of meat now as compared to the past. Most meat is purchased from the market or a local community member and may be sourced from local animals (primarily sheep and goat) or delivered (already processed) by plane. A reduction in livestock rearing due to less available grazing land as a result of population increases and agricultural production was reported, which has also reduced the availability and consumption of dairy products (including milk, curd, and ghee or butter) and egg, as shown in Table 2.

Figure 3: People Purchasing Vegetables from the Market in the Chandannath Bazaar



Availability of white rice has replaced consumption of traditional cereals/grains

People are consuming more white rice which has been made accessible through market access, aid programs, and road construction, where local, red rice (*JumliMarsi*) is not produced (such as in Patmara), or to supplement the lack of production and availability of local rice. Increases in rice consumption have corresponded with decreases in the consumption of *roti*, a flatbread which is typically made from local grains, including wheat,

barley, millet, buckwheat, and maize, in addition to declines in other recipes (described in Table 4) which require local crops. Many of these traditional and underutilized crops are believed to contribute to food security through reducing dependency on one or two staples (such as white rice), contributing to food quality and preserving dietary diversity (which has been linked to health and nutrition) (Mayes et al., 2011).

A number of explanations were given for this decline, including preference in the taste of rice over local grains and decreased drudgery in preparing and cooking rice as compared to *roti*. In Talium a respondent explained, “There were more varieties of dishes in the past. We used to alternate between local rice, maize *roti*, *lagad* made from buckwheat, *bhat* from proso millet, and *bhat* from foxtail millet.” While a few respondents indicated that appreciation of the local grains has increased, the majority claimed that despite recognizing the nutritional values of these local crops they preferred to eat rice instead and imported white rice is more available and less expensive than local rice, even in the villages where local rice is produced. The decline in local cereal varieties with the accessibility of white rice is illustrated in Table 2.

While consumption of white rice has increased over the past 50 years, people have incorporated other forms of “*bhat*” from proso and foxtail millets or maize in their diet for many generations. Respondents described having a habit of eating rice; when local rice is not available, people eat the rice that is available (including imported or improved varieties). The value of rice consumption may be linked to social status, as participants indicated that only rich people ate rice in the past, and today only the wealthy (or those with their own production) can afford to eat the local rice. Furthermore, government officials and people of particular stature were granted greater quantities and could afford better quality rice when it was first delivered to Jumla through food aid programs. People near the bazaar were perceived to consume more rice than those in villages, which were presumed to consume more *roti*.

More foods are purchased from the market than in the past, and these are primarily white rice, imported snacks, and additives.

A common assertion among FGD participants was that they are now consuming less local foods and more imported foods than they did in the past, primarily because local foods are not easily available or are very costly. Despite the diversity of imported foods now available in the market (including a wide variety of vegetables and fruits), which could be a source of improved food security, the majority of respondents said they only purchase white rice, instant noodles, biscuits (crackers or cookies), oil, sugar, and salt, all of which are consumed in greater quantities than in the past. While white rice has replaced the consumption of local cereals and grains, the low cost and ease of access of instant noodles and biscuits, (which can be quickly obtained and brought to work in the fields), have resulted in these replacing the consumption of *roti* or boiled potatoes as snacks. Purchased oil (typically mustard, soybean, or sunflower), has also replaced the production of local oils from the seeds of wild plums, cannabis, and the *Prinsepia* plant (*dhatelo*), as illustrated in Table 2. The majority of respondents indicated that all other foods consumed (primarily vegetables) comes from their own production; though some purchase vegetables from the market which they do not grow or when their own vegetables are out of season. Purchases of fruit and other foods were rarer, though those in closer proximity to the bazaar purchase a larger variety of market foods more frequently.

People prefer local foods to imported foods

Participants discussed the better taste, nutritional value, and quality of local foods over imports, but noted that these foods were often unavailable (under-produced) or very costly, which was said to be the only reasons people consume imports. A price list of common local and imported foods in Chandannath and Talium, is given in Table 5, showing that imports are generally much less expensive than the same foods produced locally. The paradox of exporting organic products and importing lower quality foods for consumption was understood by participants. A number of participants proclaimed that they do not trust imported foods because of the chemicals used on them and believe that they are adulterated (e.g. white rice mixed with lower quality white rice). Some respondents believed that people have lower life expectancies, are not as strong and healthy, and are getting sick now, from eating more imported foods, including food aid, which has typically been in the form of imported white rice. While there is no evidence to confirm this, the nutritional value of locally grown foods and traditional crops and cereals are well documented (Fanzo, Hunter, Borelli & Mattei, 2013) as are the declines in nutritional value of rice (including proteins, vitamins and minerals) with the higher degree of polishing it receives (as in white rice, which receives 8-10 percent bran removal through polishing) (FAO, 2006). When asked if the direction of food habit changes was positive or negative, the majority of participants replied that food security has increased, because people can now get enough food (whereas in the past there were food shortages), however they also noted that nutrition has decreased because they are eating less local foods and more food imports. What might not be well understood is the increased dependency people have on external sources for food supply, leaving them more vulnerable to food system shocks.

Food production is more geared towards market sales than in the past

In many ways food production is aligned with changes in food consumption. People are producing more cash crops now, primarily apples, beans, and potatoes which can be marketed for export, in addition to new vegetable varieties which they can sell at the market. This is a result of the decreased labour involved in the production of these cash crops (as compared to local millets), as well as the lack of market for local crops. Barley and maize were reportedly used as much for animal feed as for human consumption, and various grains are now used more for producing local alcohol (*raksi*) than for food, indicative of the changing uses of traditional crops. One of the farmers from Talium said that he is producing less local crops (such as millet and buckwheat) because the demand for these has declined. Lack of production also affects demand however, through driving up prices and the unavailability of foods discouraging purchasing patterns. While most respondents claim to produce for their own subsistence, many stated that even when their own production was insufficient to meet household needs, they still put aside produce to sell in the market. This can promote food security through providing people with income which can be used to purchase a diversity of market foods, however most respondents in this study indicated that they mostly limit market purchases to white rice, processed snacks (instant noodles and biscuits), oil, and sugar.

Women are the primary custodians of the food system

While there is some indication that gender roles in food production and consumption have changed, this remains primarily the role of women. Some women said they receive help from their children (particularly girls) and/or husbands with food production, but this is rare

and decreasing with greater opportunities for wage labour outside of the agriculture sector. Respondents from the women's FGD stated that if community members see men working (in the fields), they talk negatively about it. Women are responsible for carrying produce to the market to sell, sometimes walking for hours with large, bamboo baskets strapped to their foreheads. In a number of cases, respondents indicated that men only help with food-based labour when they are "not drunk" or "playing cards".

Decisions about which foods to produce or consume lie with the women or occasionally are shared between husband and wife and are based on the family's food needs, the potential for food sales, and consideration of weather or pests and diseases. Family members may influence food consumption, particularly with men requesting to have rice (which is also easier to prepare than traditional grains such as millets), and children requesting various "treats" such as meat, fruit, dairy, or instant noodles. Whereas in the past, women were expected to eat different and less preferred foods than men, such as *roti* or *bhat* made of proso millet rather than rice, respondents said they now consume the same food.

FACTORS CONTRIBUTING TO FOOD HABIT CHANGES

There are diverse factors contributing to changes in food habits

During the course of the FGDs, participants cited 20 major causal factors of food habit changes which have been documented in Table 3. These include environmental (e.g. disease or drought), economic (e.g. wage income and purchasing power), and social factors (e.g. children in school), and many which span between these sectors, illustrating the interconnected nature of the causal factors of food habit changes. While some of these "naturally" progressed without planning or intention (e.g. the decline of natural vegetation or population increase), others were the results of deliberate policy changes (e.g. food aid or the introduction of new vegetable seed varieties). Some were synonymous with socioeconomic development in Jumla (e.g. road construction, reduction in ethnic disparities, and knowledge of health and nutrition), while others illustrate persisting barriers and challenges to development (e.g. irrigation problems, high levels of drudgery and lack of profit associated with local crops). The oldest of these causal factors, described in the 1960s and 1970s by participants, (as illustrated in the Timeline, Figure 6), relate to poor weather, pests and diseases, and the introduction of white rice, primarily through food aid programs. The most recent of these factors (in the past 10 years) reference Karnali Highway construction ("food for work" -relating to wage and market access) and cash-crop production in the region.

The greatest factors contributing to food habits changes have been on food production

The majority of the causal factors listed by respondents (70 percent) were in reference to changes on production patterns rather than consumption. These include environmental challenges (hail, temperature increases, pests and disease), the reduction in the number of people working in agriculture (due to education, increased off-farm opportunities for wage labour, and shifting attitudes towards changing lifestyles e.g. "people are lazier"), and the comparative advantage of planting cash crops as opposed to local grains and cereals (including decreased labour and increased profit). Only six causal factors of change were reported which have affected food consumption habits and these largely relate to increased access to imported goods (through food aid, road construction, and purchasing power) and increased knowledge and education (in health and nutrition and seed and vegetable varieties).

Figure 4: Women Planting Rice in Talium



“Pests and diseases”, particularly rice blast, was the number one cited causal factor of food habit changes

Of all of the factors contributing to food habit changes reported during the FGDs, the most commonly cited was the impact of pests and diseases on local food production. While this included reported locust outbreaks, unknown pests, and smut disease on wheat, the vast majority of respondents referred to blast disease in rice. As illustrated in Table 3, “pests and diseases” was listed as a major causal factor of change in all of the FGDs and was also cited the most frequently (in addition to issues of climate change) throughout the FGDs. The blast problem in local rice was cited (in the Chandannath FGD, illustrated in Figure 6), as beginning in 1998 and corresponded with increased deliveries of food aid to the region. While pests and diseases are common in a variety of crops, rice blast was reported to be one of the primary reasons why people do not produce more local rice today (due to the production risks), in addition to the high demands of labour required in rice production, particularly with the district being organic. In fact the few cases in which people suggested that there may still be use of agricultural chemicals in Jumla, was in reference to “Butachlor”, used as an herbicide in rice fields. The frequency in which pests and diseases were cited as causal factors of changing food habits may be indicative of the significance of rice as a staple crop. Both crop and genetic diversity have been used to alleviate these issues in rice production.

Food aid and climate change are also significant factors contributing to food habit changes

Following pests and diseases, food aid and the effects of climate change were among the most cited causal factors of food habit changes in Jumla. As shown in Table 3, these were commonly referenced both throughout and within the FGDs. The involvement of various governmental and non-governmental organizations in Jumla over the past 50 years has reportedly been influential in changing food habits. Most specifically, these organizations have increased the quantity and accessibility of internationally, imported white rice throughout the district. More recent road construction, as well as acquired preferences, and affordability of imported white rice, have made this a staple in the typical Jumli diet.

The presence of food aid, (the Nepal Food Corporation (NFC) and the World Food Programme (WFP) being the most frequently cited), and the associated availability of imported white rice, were referenced both as positive and negative causal factors of change. In many ways they helped secure a sufficient supply of food to residents in Jumla, who no

longer have to rely on their own subsistence production for survival; however food aid was also cited as being of poor quality, unequally distributed, and as displacing local, more nutritious crops. Despite recognizing these characteristics of food aid, the corporations giving imported rice as food aid, said they do so because that is what local people are demanding. The potential for local rice (*JumliMarsi*) production is not able to fill population demands in Jumla (Sapkota et al., 2010).

While the effects of climate change are diverse, respondents most frequently referenced increasing problems of drought, unpredictability and changing precipitation patterns, and rising temperatures as threatening and challenging agricultural production. Intermittent rainfall and fluctuating temperatures have been found to affect rice production in Jumla (Sapkota et al., 2010). Despite recognizing the effects of climate change, community members do not seem to be shifting towards the production of more climate resilient crops such as millets, amaranth, and buckwheat. Therefore, although climate change is recognized as one of the most significant threats to the food system, there are other factors (taste, labour, marketing ability, knowledge) which are limiting the production of these crops. Other significant factors contributing to food habit changes (cited frequently among and within the FGDs) include the shift to cash crop production, the rise in opportunities for wage labour (and corresponding decline in people engaged in agricultural production), and greater access to market goods (particularly through road construction).

Dietary diversity: Food consumption can be diverse but frequently is not

While there is no standardized measurement of dietary diversity, consideration of food type, food group, and proportion size, are generally regarded as important components (Ruel, 2003). In each of the four VDCs, participants stated that they regularly consume *dalbhat*, (rice, pulses, and vegetable curry), twice a day as their primary meals and *roti* for snacks in-between meals, with rice being the food consumed in the greatest quantity. In the responses provided by participants, *dalbhat* consisted of local or white rice depending on production and availability (local rice is preferred but less commonly consumed), pulses were almost exclusively local beans, vegetables mostly included cauliflower, potatoes, radish and spinach, and *roti* was made from the flour of various grains including finger millet, barley, maize and wheat (and often a combination of these).

Many people in Jumla, and predominantly men, whom respondents indicated are particularly insistent on consuming rice (served in the form of *dalbhat*), seem to feel they need to eat rice to feel satisfied. As one FGD respondent explained, “In the past, we used to consume a lot of local rice and we sort of have a habit of eating rice” (Chandannath). One of the “hidden” barriers to dietary diversity in Jumla therefore, may be the persistent habits of food consumption. This corresponds to a recent statement by NeKSAP (the Nepal Food Security Monitoring System) which stated that in Jumla, “A majority of households are consuming cereals and pulses (bread and beans) as traditional food habits, but food consumption is not diversified” (NeKSAP, 2014).

Some studies have indicated that rice can be an important driver of dietary diversity by requiring that various sides of vegetables and meats or meat alternatives (such as *dal*) be consumed with it (Batres-Marquez, Jensen & Upton, 2009). In many areas of Nepal both *dal* and *bhat* are mixed with vegetables, spices, and/or ghee to enhance the flavour, but this is dependent on economic status and is not a common practice in Jumla. One participant from Talium however, explained that having beans and vegetables as sides to accompany imported,

white rice was necessary to enhance the taste (as compared to the more flavourful *Jumli Marsi*). While FGD participants did say that they rarely consume vegetables or pulses without rice, the small proportion of vegetables consumed alongside the large quantity of plain rice, in addition to the lack of diversity within these side dishes (from meal to meal), leave to question the relevance of this assertion in Jumla. Alternatively, if the cheap, white rice from the market is encouraging families to consume more vegetables, then it is also conceivable that the white rice is actually contributing to better nutrition. Both of these are empirical questions that can be explored in future studies.

A formal assessment of dietary diversity (conducted at the individual or household level) would allow for more precise results of the frequency and proportion of food types consumed, which is particularly important when assessing nutritional value (FAO, 2013). Table 2 illustrates the assortment of foods consumed by respondents, how consumption has changed from the past to the present, and the diversity of foods eaten within each of the five categories of food groups. The one type of food that was reportedly currently consumed by respondents in all FGDs is white rice. Respondents said that rice is easy to cook, people prefer it, and that they “cannot find as much local food anymore” (women’s FGD in Talium). Availability, particularly through one’s own production, is a key determinant of food consumption.

One limitation of household surveys of dietary diversity is that they imply equal distribution of food consumption within the household (UNDP, 2012). While participants generally described consuming the same foods within the household, children at times received a greater diversity of foods as requested. For example, most respondents said they do not consume fruit, meat, or dairy products regularly due to the high cost of these foods; however children are sometimes treated to these “tasty” foods as they request them, though families can rarely afford them. Closer to the bazaar in Chandannath, children are also treated to instant noodles (fried with a small portion of vegetables or more commonly eaten dry, straight from the package). As has been suggested in previous studies, women are the “gatekeepers” of food consumption, but children and husbands still have influential roles in requesting certain foods (Lentz, 1999). Therefore despite being the custodians of food systems, prioritizing men and children means that women are likely to make the most sacrifices (in health and nutrition) to their own diets.

People lack diversity in cooking/preparation methods

Nearly all respondents in the FGDs indicated that they only knew a limited number of ways to prepare foods. Most foods were prepared following the *dalbhattarkari* recipe of pressure-cooking rice and pulses (separately), and braising or frying vegetables into a curry. Other techniques such as fermenting, drying, and smoking foods are used to a lesser extent, primarily for preservation of vegetables and meats. While a number of recipes were shared for local cereals and grains, as shown in Table 4, these have largely been replaced by the consumption of white rice. Employing easier processing technology for traditional grains may help to diversify the ingredients and recipes used. Most respondents indicated that they would like to learn new recipes and different ways of preparing foods. While a few respondents said they had received training in new cooking methods including different types of cakes and porridge, few of them had the kitchen supplies needed to prepare these dishes.

Dietary diversity is desired, but not necessarily prioritized

When respondents were asked if they were happy with their current diets (primarily consisting of *dalbhat* twice a day, and snacks such as *roti* in-between), they replied that they generally were, noting that food supply was more secure than in the past. They also said that they would like to incorporate healthier and tastier foods which included many of the local grains such as buckwheat and millet, and greater diversity among food groups in their diets. As one participant from Chandannath responded, “We are quite satisfied with our diet, but we want to have more variety”.

Participants were also asked to name their ideal meals within a day. In all four VDCs, the ideal foods listed by participants were quite diverse in food groups and food types, including a mix of rice (preferably local), *dal*, *roti* made from different grains (barley, buckwheat, finger millet and wheat), more meats and dairy products and a greater variety of fruits and vegetables. When asked to describe which vegetables they would ideally consume, respondents in Patmara replied “whatever we can get”, underscoring the “food for subsistence” mentality and seasonal availability of diverse foods in Jumla, which limits (likely for legitimate reason) the extent of dietary diversity. Imported foods were rarely mentioned as a part of this ideal meal, though some said they may prefer instant noodles if they lack the time to prepare *roti*, or noted that children’s preferences would likely include more instant noodles and biscuits. The primary reason given for not consuming more of these “ideal” foods was their high costs and lack of availability in the market. While these responses indicate a preference for diversity, many participants said they would eat these “ideal” meals everyday if they could.

When asked which foods people disliked the most, respondents commonly replied *roti* because of the work it took to prepare, or instant noodles because they were unhealthy. Others (and most notably the youth) said their least favourite foods were amaranth, barley, foxtail millet, and proso millet because they did not like the taste. The concern respondents have about nutrition is at times contradictory with their consumption habits. Consumption of “unhealthy” imports over “healthy” traditional grains suggests that convenience and taste are important determinants of food consumption.

While there was some indication that with increased income people would improve their dietary diversity, there were a number of factors which suggested that this may not be the case. As most food for consumption comes from subsistence production, extra income may not mean that people begin to buy more types of foods from the market, as income from sales is currently used primarily to purchase white rice and additives such as oil, sugar, and salt, rather than a greater diversity of food types. Secondly, many of the foods that people desire more of are locally produced, and (according to respondents) difficult to acquire (due to cost and availability in the market), preventing them from purchasing these foods. Thirdly, many people said that despite wanting different types of foods, they do not trust them. Imported products are believed to be produced using chemicals and adulterated with lower quality foods, while some participants said they were even skeptical of some local foods, such as ghee, which could be mixed with cheaper additives (such as vegetable oil). Finally, when asked which foods would be purchased if extra income were available, respondents from Chandannath declared that if they had more money they would migrate to the city. This indicates that for smallholder farmers in rural areas with limited economic and employment opportunities, dietary diversity, while desirable, is not an issue of priority.

People value diversity but there are barriers to accessing it

In all FGDs respondents stated that dietary diversity is important for health and nutrition as well as for taste. While many said their diets are currently diverse, others expressed a desire to further increase diversity. Whether dietary diversity had increased or decreased over time was more contested. One respondent claimed that “diversity of foods has decreased because mostly white rice is eaten and *roti* only for a snack” (Chandannath), while another said “We think that diversity in our food has increased as compared to before. We get seeds of diverse vegetables from the District Agriculture Development Office” (Taliun). In general, respondents explained that there are more foods available now than there were in the past but that they are less nutritious.

Respondent’s recognition of the diversity of foods available and of the poor nutrition of their own diets, illustrates the barriers that people have to accessing nutritious foods. While participants have certainly vocalized their preference for local food, many traditional grains and cereals and dairy products are not available in the market, as production of these has declined. Within the main streets of the bazaar one is hard-pressed to find a shop which sells local rice, and where it is sold the price can be one or two times that of imported rice, as illustrated in Table 5. Prices for most other cereals and grains could not be attained as these foods are not available in the market. Therefore local food is both unavailable and inaccessible, two factors which limit healthy diets (Johns & Sthapit, 2004).

In Jumla, people lack both physical and financial access to dietary diversity, which has important implications on food security (WHO, 2014). While the construction of roads, linking many VDCs to the Jumla bazaar and onward to Surkhet District, has substantially improved physical access to market goods, for many Jumli residents these goods are still multiple hours away by walking. While local foods are costly to purchase in the market, many of the healthier imported foods such as fruit and meat are also expensive, as illustrated in Table 5. For the people of Jumla, these challenges of availability and access are significant barriers to dietary diversity.

CONCLUSION AND IMPLICATIONS

As this study illustrates, food habits in Jumla are changing as a result of diverse but interrelated environmental, social and economic factors which have impacted dietary diversity and the value people place on it.

Fruits, vegetables and meats are consumed with greater frequency than in the past, though dairy and egg consumption has declined. The availability of cheap rice has allowed for the consumption of *dal bhat* more regularly and consequently the use of other traditional grain varieties has declined. While people can now more easily consume sufficient quantities of food, the quality of food consumed has not necessarily improved. Though people prefer local (and organic) foods, the availability, convenience and low cost of less nutritious imports have resulted in greater consumption of these foods. Food production is more geared towards market sales and particularly the more profitable apples, beans, and vegetable crops over the less demanded traditional crops such as millets and buckwheat. Though consumption is still largely subsistence-based, people are purchasing imported white rice, instant noodles, biscuits, oil, sugar and salt from the market regularly. Women continue to be the primary custodians of food systems, though the preferences and opinions of men and children are influential. While greater consumption of fruits, vegetables and meats can promote greater

food security, the loss of production and consumption of traditional cereals and grains and the current purchasing patterns of white rice, processed snacks and food additives (oil, sugar, and salt) threaten it.

The changes to food habits appear to be influenced by a diversity of interconnected factors, the majority of which are related to changes in food production. Pests and diseases and particularly the onset of rice blast was the most frequently cited causal factor of food changes, both among and within FGDs. Food aid and the corresponding availability of imported rice in addition to the impacts of climate change were other commonly cited factors.

While people in Jumla value dietary diversity, their own consumption is limited by availability, access, and food habits and preferences. Local foods (such as dairy products and traditional grains) are difficult to obtain in the market, due to their limited production, and those foods which are available are extremely costly as compared to their imported counterparts. Lack of physical and financial access also restricts the consumption of healthy imports (including meats and fruits). While dietary diversity is certainly limited by socioeconomic factors in Jumla, many people seem fixed in consistent food consumption habits which further restrict it. The regular consumption of *dalbhat* as a dietary preference is consistent with findings by Lentz (1999) in which food habits are sustained through satisfaction and pride for one “simple but perfect meal”. Therefore, it is suggested that people in Jumla need to *reacquire a taste for diversity* in order to improve food security and promote sustainable diets (Burlingame & Dernini, 2010).

Based on the findings of this study, governmental and nongovernmental organizations in Jumla should create and promote a market for local foods, and better support the production of a diversity of foods, particularly targeting women and youth who are a pivotal part of the food system. Traditional and organic cereals and grains should be further promoted to urban consumers who do not have access to these foods otherwise, and who may be willing to pay a higher price for them. These measures can be important in decreasing dependency on subsidized imports and food aid, while supporting agricultural employment which is crucial for food security (WHO, 2014), and has been declining due to greater opportunities in wage labour and education.

The environmental and socioeconomic linkages to the food system, as evident in the variety of factors contributing to food habit changes, emphasize the need for development and food security initiatives to be considered collectively, as there has been a lack of collaboration between the various organizations working on these interventions in Jumla. Furthermore, organic food production needs to be supplemented with the knowledge and materials required to use organic herbicides and pesticides, and crop specialization must be matched with ensuring access to a variety of food imports. While specialization in food production can be an important driver of economic growth, it works best where people have access to food imports, which can supplement the diversity that is lost in production (UNDP, 2012).

Educating community members on the importance of dietary diversity for food security (including nutritional benefits and climate change resilience) would increase demand (and production and consumption) of traditional cereals and grains and may expand and diversify the types of food aid supplied to the region which could benefit community members economically, environmentally, and socially (through improvements to health). Knowledge and information are influential in changing food habits (Fanzo, Cogill & Mattei,

2012). Various organizations involved in food security initiatives in Jumla should work to promote new processing technologies, cooking methods and recipes which enable resident's to reacquire a taste for diversity. These need to be applicable to local conditions (limited power, fuel, and water) and kitchen supplies. With adequate support and investment, there is much potential for Jumla to increase and diversify its food system through expanding on previous initiatives (such as the production and processing of organic apple products) and linking those to new ones (such as the development of a bakery or brewery, as was suggested by a respondent in Chandannath). Through integrating dietary diversity in production, processing, and consumption patterns, people of Jumla can reacquire a taste for -and habit of- dietary diversity.

Potential for Future Research and Development Interventions

These findings illustrate the significance of understanding the value of dietary diversity as a significant factor in determining food habits. Additional studies in other regions should further explore these connections, in addition to rural and urban comparisons in Nepal and elsewhere. Understanding how rice consumption affects nutrition as well as the nutritional value of local foods as compared to imported foods in Jumla, and particularly the nutritional qualities of the local rice, *JumliMarsi*, as compared to improved varieties and the various types of imported rice available, would also help to evaluate food habit changes in the region. The changes in food habits over time, the factors contributing to these changes, and the value people have for dietary diversity are clearly intricately connected. Understanding these connections is critical to enhancing food security.

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Appendix

Figure 5: VDC Map of Jumla (Map compiled by EpshaPalikhey from various data available from the Department of Survey, 2002)

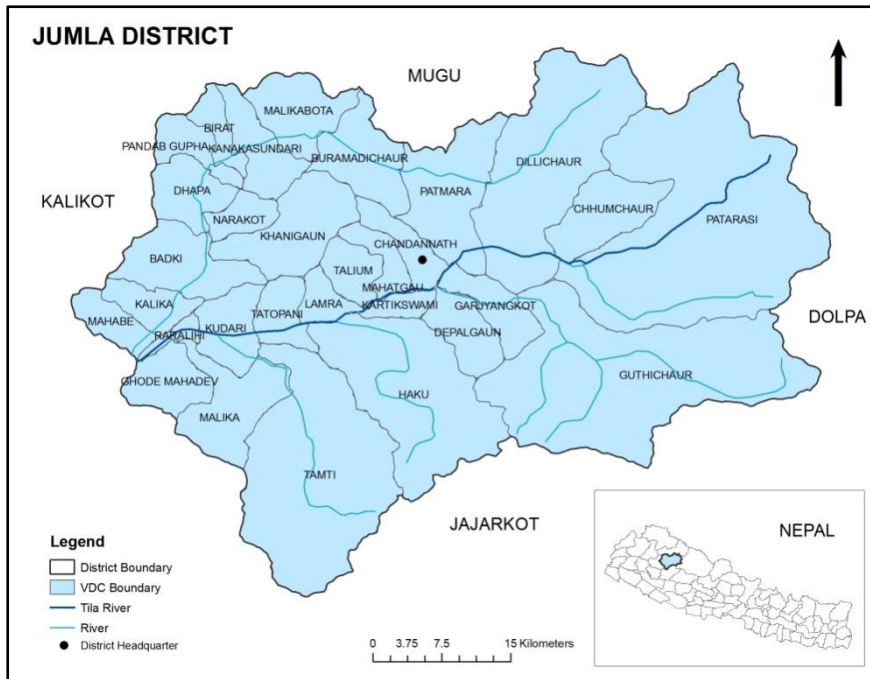


Table 1: Focus Groups Discussions⁵

Date (2014)	Focus Group Discussion	Food Determining Traits	Number of Women Participants	Number of Men Participants	Total Number of Participants
June 3	Chandannath, Preparatory Discussion	-	2	8	10
June 7	Talium, Preparatory Discussion	-	5	13	18
June 15	Chandannath, Youth Discussion	-	4	4	8
June 19	Depalgaun, General Discussion	Irrigation with rice production	1	16	17
June 22	Patmara, General Discussion	Least market access; Lower standard of living; Irrigation but no rice production	6	6	12
June 28	Talium, Women's Group	-	11	0	11
June 29	Chandannath, General Discussion	Market access; Higher standard of living	4	8	12
June 30	Talium, General Discussion	Poor irrigation, reliance on precipitation	8	13	21
-	-	-	41 (38%)	68 (62%)	109

¹ Regarding food determining traits: Market access is based on proximity to the main bazaar in Jumla while standard of living is measured by average annual income per person (District Administration Office, 2009)

Table 2: Food Consumption per FGD, Pastand Present

CONSUMPTION	Chandannath June 3/PAST	Chandannath June 3/PRESENT	Talium June 7/PAST	Talium June 7/PRESENT	Depalgaun June 19/PAST	Depalgaun June 19/PRESENT	Patmara June 22/PAST	Patmara June 22/PRESENT	Chandannath June 29/PAST	Chandannth June 29/PRESENT	Talium June 30/PAST	Talium June 30/PRESENT
Cereals/Grains												
amaranth	1											
barley	1	1	1		1				1	1	1	1
buckwheat	1		1		1				1		1	
finger millet	1	1	1		1				1	1	1	
foxtail millet	1				1				1		1	
maize	1	1				1	1		1		1	1
porso millet	1				1				1		1	
rice (white)	1	1		1		1	1		1		1	1
rice (local)	1	1	1		1	1	1		1		1	
rice (beaten)											1	
wheat	1	1	1		1		1		1		1	
TOTALS	10	6	5	1	7	3	4	5	6	7	5	2
Vegetables/Pulses												
amaranth leaves	1											
beans	1	1	1		1	1	1		1		1	1
black-eyed beans						1			1			
black gram			1									
broadleaf mustard	1	1			1							1
buckwheat leaves	1		1		1						1	
cabbage		1										1
carrot		1						1				
cauliflower		1				1		1		1		1
cress	1											
cucumber		1										
gourd or other squash	1											
horse gram			1			1						
lambs quarter											1	
lentils		1								1		
maize	1	1	1									1
mushroom	1		1									
nettle	1					1						
onion												1
opium leaves	1	1										
peas			1			1						
potato	1	1			1	1	1		1		1	
pumpkin	1	1	1								1	
radish	1	1						1		1	1	
rice bean	1		1									
soybean	1	1	1		1				1			1
spinach/"saag"										1		1
sweet potato	1											
taro leaves	1	1										
tomato		1				1						
turnip	1											
wild elephant foot												
yam leaves	1	1										
wild vegetables	1		1		1		1					
zucchini						1						
TOTALS	20	16	11	0	6	9	3	6	6	6	5	8

Meat							
buffalo							
chicken		1			1		2
fish	1						1
goat	1	1		1	1		5
pork							
rabbit					1		1
sheep	1	1		1	1		4
TOTALS	3	3		2	2	3	13
Fruit							
apple	1	1		1			1
banana				1			
local plums	1						1
mango				1			
pomegranate				1			
watermelon				1			
wild fruit	1		1				
TOTALS	3	1	1	5			2
Dairy and Egg							
butter/ghee	1	1		1		1	4
curd	1			1		1	3
egg							
milk	1		1	1		1	4
TOTALS	3	1	1	3		3	11
Oil							
purchased (mustard, soybean, sunflower)		1		1		1	1
apricot, peaches, plum	1		1				
cannabis			1				
mustard			1				
persimmon	1						
principia	1		1				
walnut	1		1				
TOTALS	4	1	5	1	1	1	1
honey	1		1				
Other Imports							
biscuits	1			1		1	
noodles				1		1	
salt	1	1	1			1	1
sugar	1					1	
TOTALS	3	1	1	2		4	1

Table 3: Factors Contributing to Food Habit Changes

DRIVERS OF CHANGE AFFECTING PRODUCTION...	Chandannath June 3	Talium June 7	Depalgaun June 19	Patmara June 22	Chandannath June 29	Talium June 30	# of Times Cited	# of FGDs Cited in
shift to cash crop production (less labour, more profit, can't do both local and cash crops)	2		2			1	6	4
chemical use		1				1	3	3
children in school/"ghar dailo" program (not farming)			1			1	2	2
climate change -drought/precipitation irregularity/temperature increase	1	3				1	9	4
deforestation (less natural vegetation)		1					1	1
high labour/work/time involved in producing local crops	1	1	1				3	3
irrigation problems	1					1	2	2
lack of land/population increase	1	1	2			1	5	4
low market demand/low profit for local foods			1				1	1
"people are lazier"; don't want to work hard		1		1		1	3	3
pests and diseases (rice blast, black smut in wheat)	3	1	1	1	2	1	9	6
poor weather (hail, heavy rainfall)				2	1		3	2
received training to produce new foods (vegetables, apples, cash crops)						1	1	1
wage labour (less people working in agriculture)	1	1			2	3	7	4
AFFECTING CONSUMPTION...								
food aid/food-for-work, increasing white rice consumption (GOs, NGOs, INGOs)	2		1	2	1	1	7	5
greater access to market goods (road construction, airplanes)	3		1	1	2		7	4
income increase -wage labour, cash crops (more money to purchase market goods)	1	3					4	2
introduction of new vegetables/seeds		2		1			3	2
knowledge about health/nutrition		1		1	2	1	5	4
reduction in caste/ethnic discrepancies	1						1	1

Table 4: Traditional Recipe List

SN	Food item	Detail
1	Asuro	Fermented dried roots of local radish, <i>choto</i> boiled in water adding some salt and spices
2	Bhange noon	Spice made from the roasted and ground cannabis seed with some salt
3	<i>Bhat</i>	Grains of rice/foxtail millet/proso millet or grits of maize cooked in water until all the water is absorbed or evaporated leaving behind fluffy grains or grits
4	Bhuja	Dried <i>karela</i> , balsom gourd (also referred to as "cuchhekarela" or "barela") boiled in water adding some salt and spices
5	Bhutekochamal	Toasted rice eaten as a snack
6	Chamre/Khatte	Fried white rice with sugar
7	Cole	Mixture of grains of maize, beans and barley cooked adding salt and spices
8	<i>Dal</i>	Soup made from beans/black soybean/black gram/horse gram (variety with very small grain), seasoned with salt and optionally spiced with dried allium, cumin seeds, dried chillies or other spices depending on the beans or pulses being used.
9	Dhakana	Boiled local pumpkin
10	Dhido	Flour porridge made by cooking maize, finger millet, or buckwheat flour in boiling water with continuous stirring until a dough-like consistency is achieved as the starch in the flour swells in the process of cooking. This dish is similar to <i>Ugali</i> commonly consumed in East Africa.
11	Dhokayo	Dried leaves of <i>banko</i> , a variety of wild elephant foot yam which is believed to be rich in calcium and protein

12	Gundruk	Fermented dried leaves of edible greens. Used to make <i>gundruk</i> stew which can contain potatoes, tomatoes, soybeans, seasoning and spices
13	Khochha	Water bread made from boiling balls of soybean flour in water
14	Pabro	Dried leaves of taro boiled in water adding some salt and spices
15	Phando	Soup made from the mixture of flour of small black soybean, bean, maize, wheat, barley, rice bean, etc adding some salt and spices
16	Phaparkodhesu (edible up to 30-32 days after making)	2 ways of preparation <ul style="list-style-type: none"> • A very thick (about 1-2 inch) bread made from buckwheat flour, ghee and honey especially cooked in iron pan and afterwards the bread is roasted in light fire flame • A big ball of bread made from mixing buckwheat flour and honey. It's uncooked.
17	Phaparkolagad	A thick unleavened pancake made from buckwheat flour batter
18	Phaparkoraeto	Soup made from barley flour adding dried leaves of buckwheat by rubbing it using both the hands when the soup is boiling
19	Pido	Round balls of <i>saatu</i> (see 21) prepared after adding salt and water
20	<i>Roti</i>	Unleavened flat bread or <i>chapatti</i> made by kneading wheat or barley flour into smooth dough, rolling the dough into circles and cooking on a pan.
21	Saatu	Flour made from roasted grains of buckwheat, finger millet, soybean eaten with hot water, tea, milk, or curd
22	Thukpa	A soup made from flour of finger millet/barley adding some ghee
23	Usinachamal	Parboiled rice. The rice is partially boiled in the husk, let to dry and then milled to remove the husk.

Table 5: Price List⁶

Food Type	Price (rupee) of Locally Produced Food		Price (rupee) of Imported Food	
	Chandannath	Talium	Chandannath	Talium
Cereals/Grains				
jumli marsi (local) rice	130-140	100	-	-
improved local rice varieties	-	85-90	-	-
white rice	-	-	50-120	60-120
wheat	*	*	*	*
amaranth	*	*	*	*
barley	-	30	-	-
buckwheat	-	80-85	*	*
foxtail millet	*	*	*	*
finger millet	*	*	*	*
maize	-	40	-	-
porso millet	*	*	*	*
Vegetables/Pulses				
beans	120-150	100-200	-	-
black-eyed beans	-	40	-	-
black gram	-	-	140	140
cabbage	50	20-50	50	-
carrot	60-80	60-80	-	-
cauliflower	60-120	30-80	40-80	-
cucumber	160	60-200	100	-
eggplant/brinjal	80-150	25-80	-	-
gourd/squash	-	40-60	120	-
horse gram	-	-	140	120-150
lentils	-	-	140-180	100-120
onion	60-80	50-80	60	-
peas	150-200	100-200	160	-
potato	30-60	25-70	-	-
pumpkin	80-100	50	80	-
radish	40-50	20-50	40-50	-
soybean	-	60	100	-
spinach/"saag"	5-20/bundle	5-15/bundle	-	-
sweet potato	-	-	100-120	80-100
taro	150-200	80-100	-	-
tomato	100-180	20-200	80	-
zucchini	60-80	50	-	-
Meat				
buffalo	300	200	-	-
chicken (broiler)	-	-	450-500	450-500
chicken (local)	600	600	-	-
fish	500	500	-	-
goat	550-600	550	-	-
pork	300-350	300-350	-	-
rabbit	-	300	-	-
sheep	600	550	-	-
Fruit				
apple	35-60	25-100	-	-
banana	-	-	100-120/dozen	100-120/dozen
grapes	300-350	150-200	-	-
local plums	2-5/plum	2-5/plum	-	-
mango	-	-	110-150	120-140
watermelon	-	-	80-100	-
Dairy and Egg				
butter/ghee	-	500-600	850	-
curd	120/litre	100/litre	-	-
egg (broiler)	-	-	10-15/egg	10-15/egg
egg (local)	-	20-25/egg	-	-
milk	100/litre	100/litre	-	-
Other				
biscuits	-	-	10-100/package	10-70/package
noodles	-	-	10-20/package	10-20/package
salt	-	-	30	30
sugar	-	-	90	90
honey	-	800-1000	-	-
oil	-	-	160-200/litre	90/litre

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⁶ Unless otherwise indicated prices are per kilogram. As of August 1, 2014, one Canadian dollar is equal to 89.41 Nepalese rupees. Improved local rice varieties include Chandannath-1 and Chandannath-3. Large price ranges reflect in- versus out-of-season prices

*These grains are not generally available in the market

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