

The political ecology of dietary transitions: Changing production and consumption patterns in the Kolli Hills, India

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Accepted in revised form June 19, 2006

Abstract. Using a case study from the Kolli Hills, India, I suggest that political ecology provides a useful theoretical basis for considering localized dietary transitions in rural, agricultural communities in developing countries. By examining the reasons for the near-disappearance of local minor millets as staple foods in three small-farmer communities, I argue that an explicit, actor-oriented analysis allows for an integration of food issues with considerations of environmental circumstances, local aspirations, and labor concerns. That is, an agricultural shift that abandons minor millets as a food resource reflects environmental changes and household economic aspirations. Such an analysis has implications for the creation of practical food security projects through the recognition and incorporation of small-farmer experiences, voices, and priorities. This research was undertaken through ethnographic fieldwork, using semi-structured interviews and participant observation as the primary methods.

Key words: Agricultural transitions, Dietary transitions, Political ecology, Rural India

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Introduction

Issues of dietary transitions represent a potential emerging focus within a broader political ecology of health perspective. Using a case study from a small farmer district in the Kolli Hills, India, I examine changes in the consumption of staple grains. Why are households in this district now consuming rice as the staple grain rather than local minor millet varieties that are both more nutritious and preferred in terms of taste? In answering this question, I argue that localized dietary transitions, particularly with regards to changes in staple food grains, must be placed within their ecological, economic, and political contexts. Considering the interactions between local aspirations, material and social resources, and natural resource use practices is key. This involves the incorporation of community voices and agency. Political ecology provides a useful theoretical basis for considering diet and food since it allows for an explicit, actor-oriented analysis that integrates food issues with environmental circumstances, local aspirations, and household decision-making.

Dietary transitions refer to changes in the types of foods that households and communities are able to access

and consume. This is often the result of dietary delocalization, that is, processes that remove food production from small farmer control by encouraging farmers to produce for cash crop markets (Pelto and Pelto, 1983). Increases in the availability and consumption of fatty foods, both in past and contemporary populations, and decreases in dietary diversity over the long term, may be the focus of concerns with dietary transitions (Pelto and Pelto 1983; Popkin et al., 1993; Cashel, 1997; Smith, 1998, 1999). Dietary diversity, or the number of foods consumed over a given period (Hoddinott and Yohannes, 2002), plays a role in food security in that people are considered to be food secure if they have access to a variety of socially acceptable foods, not simply an adequate amount of food to feel full (Anderson, 1990; FAO, 1996).

However, dietary transitions do not have to occur within large-scale populations to have significance to everyday life. Transitions may also take place on a smaller scale, affecting certain locales and communities in specific environmental and geographical contexts. These highly localized and relatively fast processes might include changes in staple grain availability in small farmer households. Staple grains may help to foster a

sense of fullness, or a reduction in hunger, but this is not necessarily accompanied by nutrient diversity, particularly when households have limited access to other foods. Such transitions may also be accompanied by local dissatisfaction with food taste and variety. An examination of the specifics of the processes shaping food access in three adjoining communities in the Kolli Hills, India, demonstrates the importance of a microanalysis of the environmental and economic politics of household decisions and food transitions.

Such an approach has implications for theoretical understandings of crop commercialization and agricultural transitions in rural areas. Rather than viewing crop commercialization and food cultivation as a dichotomy, cash and food crops can be considered in terms of their interactions with each other (Little and Horowitz, 1987), with perceptions of local environmental changes, and with household and community priorities. Moreover, considering dietary transitions from a political ecology perspective has implications for practical food and agricultural projects at both the household and community levels.

Political ecology and diet: An emerging research area

Political ecology is a broad field of research that examines resource management, development and the actions, interests, and concerns of marginalized peoples through an analysis of the local-global politics of environmental change. This includes an analysis of grassroots actor agency and local interactions with broader environmental and business processes (Bryant and Bailey, 1997; Grossman, 1998). Third World political ecology became entrenched as a research agenda in the 1980s (Bryant, 1992), demonstrated by Turshen's (1984) work in Tanzania and Blaikie and Brookfield's (1987) analysis of soil erosion. Subsequent political ecology research has tended to focus on developing countries and the ways that marginalized populations cope with a deteriorating or otherwise changing physical environment, particularly in an agricultural context (Stonich, 1993; Mehta, 1996; Grossman, 1998; Jansen, 1998). Some approaches incorporate broad theoretical and practical questions of health and disease (Baer, 1996; Andreatta, 1998; Harthorn, 1998; Kalipeni and Oppong, 1998; Mayer, 2000). However, thus far, there has been little political ecology research explicitly addressing the complex relationships among food, agricultural resource management, and the environment, although there is a considerable body of work addressing these issues from political economy and globalization perspectives (see Dewey, 1981; Dettwyler, 1992; Popkin et al., 1993; Smith, 1998, 1999; Gray et al., 2003).

When food is considered in political ecology work, it has thus far been from a broad perspective. Turshen's (1984) work on health, disease, and famine in colonial Tanzania provides a strong historical analysis. Woo-Cumings' (2002) examination of contemporary North Korea places famine in national and global contexts. DeWalt's (1998) and Mehta's (1996) work with farming populations in Honduras and India respectively treats food as a secondary issue.

What tends to be missing is an explicit examination and contextualization of localized dietary transitions.¹ It is this issue of dietary transitions, particularly in contexts of agricultural change, which represents an emerging political ecology research agenda. That is, a political ecology approach adds to other food research by explicitly considering agency and decision-making and the local politics of resource use and food access, as well as by using its strengths in applied work.

Background and methodology

The Kolli Hills lie in Tamil Nadu's Talaghat Plains (Bohle, 1992), one of a series of hills of the Eastern Ghats. Covering approximately 282 square kilometers (Kumaran et al., 1998), the Hills rise between 1000 and 1400 meters above sea level (Kumar-Range, 2001). Although surrounded by forest on the exterior, the interior has been extensively cleared for agricultural purposes. Presently, the area is approximately 51% agricultural land, and 44% forest land (Kumar-Range, 2001).

The Hills support approximately 37,000 inhabitants living in 274 hamlets. The population is primarily Malayali, a cultural group that has been assigned a Scheduled Tribe designation by the Government of India. This designation encompasses a range of broadly-defined indigenous communities scattered across the country. It is accompanied by economic, educational and political provisions that are intended to offer greater equality for marginalized groups. The Malayali are scattered in Hill areas throughout Tamil Nadu and are the largest single Scheduled Tribe in the state (Parimurugan, 2001). Subsistence and cash crop farmers, the Kolli Hills Malayali grow a variety of products, including rice, sweet cassava, coffee, vegetables, fruits, and spices. Crop specialization varies to some degree by district.

My research was situated in three villages in Thakkali Nadu, a district in a remote part of the Hills.² Each village has a population of less than 250 people. Households typically own between one and a half and five acres of land. Electricity has only been recently extended to the area. There is an adequate, if circuitous, road from the central Hills to this district. There are no telephones. Thakkali Nadu supports three small, chronically understaffed, schools.

The primary crop in Thakkali Nadu is sweet cassava. This root crop is grown for sale in the sago-starch agroindustry in the lowlands; it is not consumed locally and plays no role in household food supplies. Cassava arrived in the area about 15 years ago, coinciding with the completion of an asphalt road. Until transportation became available, large cash crops were not practical. Trucks are now hired to transport harvests to lowland processing mills. Although dependent on road infrastructure, a government responsibility, cassava itself was not introduced via a government agricultural development program. Such programs have focused on rice production to increase household food security (Rajasekaran and Warren, 1994) and fruit production. Rather, cassava was introduced to the area on a private, household basis, to support privately-owned lowland sago-starch processing factories.

Research in this area took place over nine months in 2003 and 2004. The purpose of the study was to gain a qualitative understanding of local perceptions of interactions among food, environment, and agricultural change. To this end, I undertook ethnographic fieldwork, relying on semi-structured interviews and participant observation. Unstructured conversations, focus group activities with women on food diversity, and dietary recalls supplemented primary data collection methods. I worked primarily with women, since they are responsible for food provisioning and preparation, as well as a large proportion of the agricultural labor.

Semi-structured interviews took place with 104 villagers in these communities; this included 76 women and 28 men (see Table 1 for selected characteristics of participants). Random sampling in this area was not possible for several reasons. First, working in such a manner gave the impression that I was working in an official, government capacity. This undermined the goal of forging close relationships. Second, it gave the impression that participants had little choice but to be interviewed if their household was chosen as part of the sample. This has ethical implications that are unacceptable, especially since tribal people in many parts of India tend to occupy marginalized social positions. Finally, workloads are very heavy, particularly for women, and making the time for interviews is difficult for some villagers. Thus, I relied on villagers volunteering to participate in the research. During the early stages of the research, individuals were asked if

they wished to participate. This was accomplished by asking people during household visits or while visiting people while they were working in fields. Those who agreed often referred us to neighbors and family members whom they felt would also be interested in the research questions and goals. Thus, many participants were found through snowball sampling.

I interviewed many of the participants more than once, depending on factors including themes that were elicited in the first interview, villager interest, and availability. Table 2 provides some of the key questions that were asked during interviews. I supplemented these semi-structured interviews with additional unstructured conversations in order to focus on eliciting stories about the shared memory of food. A trained research assistant/translator aided me in my interviews, which were conducted primarily in Tamil and were recorded and transcribed verbatim by the research assistant.

Participant observation, particularly in terms of mealtime observation, played a key role in this research. This provided context for the statements and data generated through interviews and other methodological activities. Participant observation added a depth of understanding that would otherwise have been missing, although this understanding was, as in any ethnographic context, partial. For example, mealtime observations demonstrated that while milk is rarely consumed by most adults, when it is available, it will be saved for children.

Other methods were used in an attempt to triangulate the data. Gathering data from multiple angles served to add depth to the perceptions and experiences elicited from interviews and participant observation. Additional methods included focus groups with nine to ten women in the different communities designed to assess the kinds of foods that women considered available for consumption. In particular, I tracked perceptions of access to minor millet crops. These are the traditional staple foods in the area. Women were asked, as a group, to develop a list of foods they might be able to access. They were then asked to rank, on a scale from zero to 30, these foods in terms of being more or less available. This is a subjective measurement of food availability, but it provides a sense of the foods available and used, particularly in conjunction with interview data. Food lists and food ranks were aggregated by village in order to compare the relative ranks of various foods within and between communities.

Table 1. Selected characteristics of participants.

Village	Females	Males	Age range	Number married	Number divorced	Job (other than agriculture)
A	41	13	18–85	49	2	School cook, shop keeper, occasional truck driver, missionary, tailor, teacher
B	16	9	22–70	24	–	Politician
C	19	6	18–85	24	–	Politician, school cook, rice mill owner

Table 2. Selected key interview questions.

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1. From where does your household get food? Do you access forest foods?
 2. How much of your food resources are from your own fields?
 3. How often do you purchase foods? What foods are available for purchase?
 4. What are the most common foods consumed in your household in a week?
 5. Do you get good food from your land?
 6. Do you prefer to grow your food?
 7. Are millets important to you? Why?
 8. Is it more healthy to eat rice or millets?
 9. How do you decide what crops to grow?
 10. How did you decide to grow cassava?
 11. What is good about growing cassava? What is bad about it?
 12. Is there another crop you would rather grow than cassava?
 13. How does your household get money?
 14. How were people able to afford the current (electricity) connection?
 15. Do you think there are village changes related to cassava? (if yes) What kinds of changes do you see?
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Additionally, dietary recalls (Dufour et al., 1999) were undertaken with 21 villagers, primarily women, from 20 different households in one community, in which I asked participants to recall the foods consumed during the morning, afternoon, and evening meals of the previous day. I also asked about any snacks between meals they might have had between meals. Participants ranged between 18 and 57 years old. I selected potential recall participants based on differences in economic backgrounds.³ Economic backgrounds were gauged in terms of the amount of land people own, ownership of commercial goods, and any secondary jobs held by family members.⁴ In practice, there is very little economic variation between households in this area. We asked villagers about their food consumption every other day over a period of 8 days, resulting in four recalls per participant, with the exception of two participants who were absent for one day each. I conducted all recalls. It should be noted that these recalls were not intended to estimate nutrient consumption. Rather, the purpose of the recalls was to triangulate data gathered through primary research methods. Specifically, recalls helped to track if and when millets and rice were consumed. Dietary recalls were analyzed in terms of the frequency of food items consumed within a day and within the entire recall period. This took place for individuals and as a body of data.

Interview data were organized according to specific themes, using keywords. During analysis of all data, several themes emerged. These included understandings of the relationship between cassava and the environment; changes in crop cultivation and priorities; access to vegetables and millets; a shift from eating millets to rice; and the proximity to market sources of food. These themes tended to be linked together by villagers; they are not isolated from one another. Additionally, they are not without connection to other issues that were raised by some villagers, such as frustration about the limited economic activities available in the area.

Preliminary analysis of data was frequently presented and discussed with several individuals involved in the study. These presentations and discussions helped verify and/or complicate my understandings of the themes and concerns villagers expressed. They also informed subsequent questions that emerged during the fieldwork.

Dietary staples in Thakkali Nadu: From minor millets to rice

Until within the last 20–30 years, the Kolli Hills Malaiyali cultivated most of their own foods. Several varieties of minor millets, including *samai*, *thenai*, *varagu*, *cambu*, and *ragi*, once played a key role in household food security and dietary diversity. Grains were accompanied by field-grown vegetables and legumes including lentils, beans, gourds, tomatoes, carrots, okra, eggplant, and gathered greens (*keera*). Millets were occasionally supplemented with rice, primarily from purchased sources. Rice was rarely consumed and was a status food indicating that a household had money to spare for purchasing food.

In his analysis of food security and traditional food systems in the Kolli Hills, Bohle (1992) argued that market integration through crop commercialization in the Hills was leading to a dependence on purchased foodstuffs. The consumption of local millet varieties was being abandoned in favor of rice purchased at ration shops or at lowland markets. Bohle linked this to the increasing focus on the cultivation of the cash crop cassava, which reflected pressures to shift from subsistence agriculture to crop commercialization. Over a decade later, my analysis of more recent planting decisions and food acquisition in Thakkali Nadu confirms a dependence on purchased foodstuffs and a focus on growing cash rather than subsistence crops. Most households in the area no longer grow local millets.

All methods of data collection indicated that rice has become the staple grain. For example, in interviews, participants consistently identified rice as the key food. In food ranking exercises, rice was consistently the highest ranked grain, and typically the highest ranked food. Millets, in contrast, were included and ranked in only one community (see Figure 1).

Analysis of dietary recalls demonstrated that rice was consumed at almost every meal by all participants. The participants from economically unstable households relied on rice in their diets the same extent as participants from economically stable households. Of the 246 meals recorded, 212 (86.1%) contained rice, either as the staple grain accompanied by vegetable and/or legume side dishes, or as *kanji*, a dish of rice and the water in which it is cooked. *Thenai* millet was consumed by two different individuals (9.25%) on one occasion. No other millet varieties were eaten.

Women cook rice daily. Millets may rarely become available, but even then, they are consumed for only one of the three daily meals. All sources of animal protein, including milk and eggs, are virtually absent from the diet; animal products tend to be reserved for special functions or festivals.

Minor millets are rarely cultivated and consumed, although villagers often articulated that these are the preferred grains and are tastier than rice. Eating millets has more than simple implications for taste and dish diversity within the household. As staple foods, minor millet varieties offer a broader range of macro and micronutrients than those available in rice. Table 3 shows the availability of selected nutrients in different millets. For example, per 100 g of cooked grain, *thenai* contains almost twice the amount of protein, *ragi* contains over 38 times the amount of calcium, *samai* contains over nine times the amount of iron, and *cambu* contains almost five times the total amount of fat, than cooked, mill-processed rice (Gopalan et al. 2004). The value of having access to these grains was traditionally maximized through a practice of consuming a different millet variety at each meal of the day. This would help compensate for the different values of macro and micronutrients.

In Thakkali Nadu, where cassava has been widely adopted as the primary crop, dietary foci have changed. Cash cropping, rather than subsistence farming, has become the primary economic practice. As agricultural lands are increasingly diverted for growing cassava, food production for local consumption has decreased. Such a shift from subsistence to cash cropping does not necessarily mean that diets must change, providing that there are the opportunities and means to purchase diverse foodstuffs. However, relative geographical isolation and a lack of a direct road to lowland markets mean that purchases must be laboriously carried uphill from the nearest market. The journey takes several hours along

footpaths. Consequently, food is often purchased in limited quantities, with people concentrating on what they consider to be essential foods, such as tomatoes, onions, garlic, lentils, rice, and spices. Rice is grown in the area by most farmers, but yields cannot support annual needs. Purchased or ration shop rice is thus key for day-to-day diets. In addition, cassava prices are not stable and fluctuate annually. The rate may be half, or even double, of the previous year. This has implications in terms of money available for food purchases.

Moreover, millet varieties are not generally available for purchase, making rice the most viable and accessible staple food. Villagers tend to lament the loss of millets, complaining of dietary monotony, dislike of rice, and concerns about rice making them weak, and as one woman put it, “dry husks”. This mix of factors led one 27-year-old farmer to point out that “...nowadays it’s a food problem and a money problem.” The environmental and economic contexts of these transitions are addressed in the following sections.

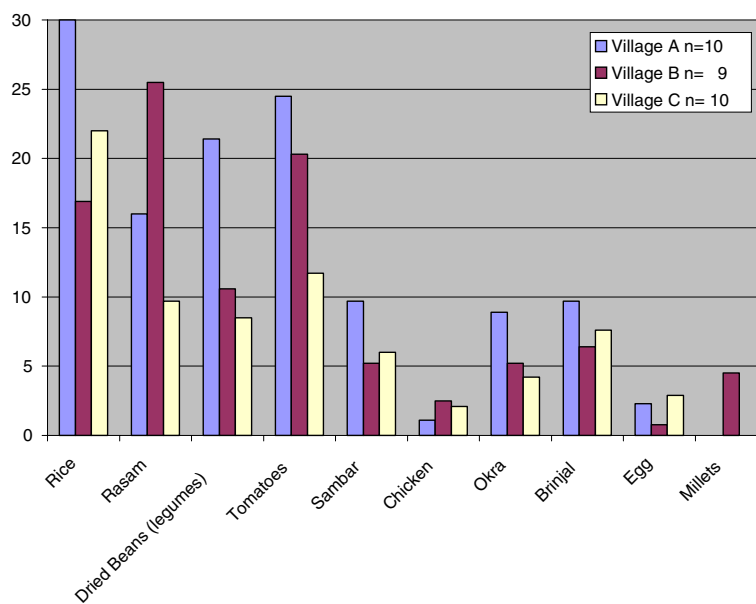
The political ecology of dietary change: Environmental changes and material/social resources

Considering the social and physical environments allows for a complex model of localized dietary changes. Local agency and experiences emerge when agricultural decision-making becomes the prioritized centre of analysis. The physical environment encompasses agricultural practices and the physical factors that farmers perceive as affecting crop productivity and viability. The social environment refers to the priorities, preferences, and aspirations of farmers themselves, as well as the ways in which social and natural resources intersect (Moffat and Finnis, 2005).

The physical environment: Unreliable rainfall, unreliable crops

Perceptions of environmental security, the ability of an ecosystem to support human livelihoods (Thrupp and Megateli, 1999), can influence small farmer planting decisions. This encompasses a number of potential factors, but in Thakkali Nadu, rainfall is the key marker of environmental security. Since fields are not irrigated, changing rainfall patterns affect food crop productivity; this influences decisions about what crops to grow.

Rainfall patterns were consistently described as unpredictable and disappointing. In particular, the May–June rains, upon which millet crops depend, are perceived by villagers as increasingly erratic. Hence, crops that rely on these seasonal rains are considered more likely to fail. Villagers blame decreases in minor



Food

Figure 1. Average rank of selected foods by village, where 0 represents not available and 30 indicates always consumed.

Table 3. Nutrients in white rice and minor millets

Food (100 g)	Energy (Kcal)	Protein (g)	Fat (g)	Fiber (g)	Carbohydrate (g)	Phosphorus (mg)	Calcium (mg)	Iron (mg)
Rice (milled, cooked)	346	6.4	0.4	0.2	79.0	143.0	9.0	1.0
Bajra (cambu)	361	11.6	5.0	1.2	67.5	296.0	42.0	8.0
Italian millet (thenai)	331	12.3	4.3	8.0	60.9	290.0	31.0	2.8
Pani-varagu	341	12.5	1.1	2.2	70.4	206.0	14.0	0.8
Ragi	328	7.3	1.3	3.6	72.0	283.0	344.0	3.9
Samai	341	7.7	4.7	7.6	67.0	220.0	17.0	9.3
Varagu	309	8.3	1.4	9.0	65.9	188.0	17.0	0.5

Source: Gopalan et al. 2004.

millet and vegetable productivity and an almost complete failure of rice in 2002–2003 on increasingly erratic and inadequate rains.⁵

Cassava, in contrast, does not require the same rainfall patterns, as it is planted later in the year, prior to the winter rainy season in October–December when farmers feel that rainfall will be more reliable. It is also relatively drought-resistant. Most participants link rainfall pattern changes to the increasing cultivation of cassava. Even households that had not initially planted cassava are now dedicating most of their fields to this single crop. It is not unusual for people to indicate that cassava is the best crop to grow when rainfall patterns are unpredictable. Even when yields are small, cassava allows people to continue to “have a job”. It is perceived to be a less risky choice that helps maintain some degree of food security, since it provides income that can be used to purchase food. In contrast, growing household food supplies is considered increasingly risky. Thus, as one 40-year-old

man stated, “We used to eat *thenai*, different types of millets. Now we are not having...we are planting cassava...the rain is not suitable for growing millets.”

Such agricultural decision-making is what Ortner (2001) refers to as intention, the “variety of culturally constituted desires, purposes, and projects that emerge from and of course reproduce different socially constituted positions and subjectivities” (see also Bennett, 1969; Jansen, 1998). That is, a conscious decision to grow cassava can be understood as a project, a coping strategy, shaped by the structural environmental constraints that people face. Earlier works on agricultural changes have highlighted similar points, although using different language. For example, Bennett’s work in rural Saskatchewan uses the term ‘adaptive strategies’ to argue that, “Even in ecologically constrained situations...people are confronted with choices and the need to make decisions” (1969:15). DeWalt (1979) makes a similar argument with regard to Mexican small

farmers. As I argue in the following section, cassava as a project is also shaped by farmers' social and economic aspirations.

The social environment: Labor, goods, and generating a cash income

The expansion of cassava fields is related to a number of social factors, including labor issues and a desire for access to a cash income, material, and social goods. One of the strengths of taking a political ecology approach is that it allows for contradictions to surface (Bryant and Bailey, 1997). In this case, although villagers decry dietary monotony and lament the loss of millets, cassava is often spoken of in positive terms. In particular, villagers value cassava for the cash income the crop brings, as well as for the reduction in agricultural labor that the crop represents. In terms of labor, cassava is relatively easy to grow, requiring less care and weeding. In the context of rainfall pattern changes and no irrigation, millet and vegetable crops would require hand watering. Since agricultural fields are well-distributed over a large geographical area, some farmers would have to walk over an hour from their fields to the nearest well. Hand watering thus represents a significant increase in labor demands that is not possible for most households. Additionally, millets as a staple food require more time and labor for processing. Women are responsible for preparing grains for cooking. This entails grinding or hand pounding of the grains to remove the outer husks, a time-consuming and physically arduous task. In contrast, rice is purchased pre-processed, and locally cultivated rice can be ground in one of two new electric mills.

These labor issues, particularly in terms of field work, contribute to a degree of community pressure to cultivate the crop. It is not uncommon for people to state that they decided to grow cassava partially because everyone else is growing it. Since local people perform exchange and wage labor in their neighbors' fields, this suggests that pressures to adopt the crop are at least partially related to labor issues. For example, a 70-year-old man argued that since people have become accustomed to lighter tapioca workloads, they are not interested in taking more difficult kinds of paid agricultural labor.

Cassava also offers economic opportunities. The annual, lump-sum income associated with the crop is particularly important given that the district is relatively isolated with limited economic options. There are no industrial or service alternatives, and any secondary occupations such as shopkeeper and tailor are all dependent on the disposable household income generated through agricultural means.

In addition to these factors, there has been a shift in values associated with material and social resources. There are increasing demands for market goods and

commodities including jewelry, electricity, electronic goods, and private English-language or Tamil-language school education for children. This is often discussed by villagers in terms of aspirations and projects aimed at becoming "developed" and more like people who live in lowland towns (Finnis, 2006). The past is described as a time when people did not need much money and ate well, but the present is understood as a time of high cash demands and food monotony. Whereas older participants spoke of good food as being the priority in the past, money is now classified by most villagers as paramount. As a 30-year-old woman stated, "Sticks [cassava] are cash crops, that's why people grow them, not only no rain. The people want jewels, the cash...we can't sell and make money from *samai* and *thenai*. We can only eat it." During a subsequent interview, she reiterated this point, saying, "We grow cassava because it is a cash crop [*moneyparar*]."

Jewels and other material commodities are immediate priorities. Jewels, purchased for wives and daughters, provide status, wealth, and security for women and families. They can be sold when large sums of money are needed. Villagers are also deeply invested in being able to purchase commodity goods advertised on newly purchased televisions, and in newspapers and magazines. A wider variety of clothing, motorcycles, kitchen conveniences, televisions, and other household items are all identified as signifiers of the more "developed" lifestyle that villagers associate with lowland town and city dwellers.

Education is an important long-term goal for households with children. The local schools, which provide education up to a maximum of 8th standard,⁶ are considered substandard. They are consistently understaffed, due in part to the difficulties of attracting teachers to such a remote and under-serviced location. Farmers are well aware that a good education can contribute to a better life for their children, particularly given that some of their former neighbors have left the Kolli Hills and have been able to send their children to post-secondary institutions. With cassava income, households are better able to afford tuition and boarding fees for residential schools outside of the Hills. A 33-year-old father outlined the relationship between cassava, school, and household needs, saying, "Ten years ago, we planted *ragi*, maize, and millets. Since these do not give us profit, we started planting cassava. It gives nice profit for us. If we planted *ragi*, maize, and millets, the amount is not enough to buy dresses, for eating, and for studying. If I keep cassava, I get some profits."

Electricity also represents a large monetary outlay. Installation of household electricity costs between Rs.2000–5000, with monthly bills of approximately Rs.40. The daily labor wage ranges between Rs.25–60. Without the lump sums of money that villagers receive

from annual cassava harvests, household electricity would not be a financial option. All participants indicated that electricity installation had been paid for by cassava-related income.

Improved access to social and material resources are key goals for farmers. These resources intersect with natural resource use and changes in the physical environment in that growing a cash crop provides households with some disposable income. While changes in rainfall patterns is one reason that farmers have adopted cassava cultivation, this physical environment factor is often discussed interchangeably with economic and goods/services goals. Cassava may be called the “best” crop to grow in a context of environmental insecurity, and a few minutes later, called the “best” crop for reducing labor expenditure and providing an income.

Environmental and economic issues around cassava cultivation further intersect when it comes to crop expansion. Household decisions to deforest landholdings are largely a consequence of cassava expansion. Certainly, after the construction of the road into the area in the late 1980s, trees could be sold for a good profit; land clearing has also taken place historically for subsistence crop fields and for lumber and wood fuel needs. However, more important in recent years is the cutting of trees to allow for the expansion of cassava fields. Such decisions are responses to uneven market situations and fluctuating cassava market rates, decreasing soil fertility, and increasing household expenses. Many farmers are concerned that tapioca is not a sustainable long-term practice, particularly given an increasing need for chemical fertilizers each year. However, immediate household needs and goals help shape people’s environmental actions, even when they are aware of negative long-term consequences. Watts (1989), Stonich (1993) and DeWalt (1998) have highlighted similar recognitions and calculations among farmers and peasants in other parts of the world.

Towards a political ecology of dietary change

My work with villagers in Thakkali Nadu has raised a number of points around changes to staple diets in the Kolli Hills. Working closely with local people has added depth to previous work in the area, including Bohle’s (1992) discussion of the ways in which external influences and integration into a market economy has damaged food security and dietary diversity in the Hills.

Questions of contemporary dietary changes have been examined from other theoretical approaches, including epidemiology and nutritional science (Hatloy et al., 1998; Hu, 2002; Foote et al., 2004), a human rights perspective (Haddad and Oshaug, 1999), and nutritional or cultural anthropology (Fleuret and Fleuret, 1980;

Messer, 1984; Ferguson, 1993; Omori and Greksa, 2002; Ulijaszek, 2003). Environment may be considered in some of these approaches, depending on the context of the research. Why then might a political ecology perspective be of value?

Working from a micro-level perspective allows the political ecology of dietary change to emerge from the experiences, priorities, and decisions of people living in highly localized areas. This allows us to elicit individual and community stories and collective histories around diet, food production, and agriculture. This can be referred to as the shared memory of food.

Political ecology research on environmental resistance demonstrates that while local actors can be the losers, they have the ability to resist, minimize, and adapt to encroachment and environmental destruction (Bryant and Bailey, 1997). The focus on agency in resistance movements can be expanded to a consideration of coping strategies and decision-making in day-to-day life. This provides a way to assess decisions to grow cash crops, and the implications that this can have on local diets (Henrich, 1997). Thus, we can move beyond a consideration of external forces such as market integration alone.

Nevertheless, household, village, and district-level coping mechanisms and agricultural practices must be placed in contexts of global processes and politics of environmental change that local people have little or no ability to control. In Thakkali Nadu, rainfall pattern changes are beyond the control of farmers. Farmers attempt to cope as best they can with their perceptions of rainfall pattern difficulties, making crop choices that, at least in part, reflect their physical environment. At the same time, these choices are changing the physical environment by, for example, encouraging the clear-cutting of land to expand cash crop fields.

In terms of the politics of food changes, it is also essential to gain some understanding of how government policies and/or private enterprise intersect with food access. This offers a wider context for an analysis of the relationships between agricultural transitions and food practices. Rice cultivation was introduced into the Kolli Hills as part of a government program to increase food security (Rajasekaran and Warren, 1994). Evidence suggests that this has largely been unsuccessful in Thakkali Nadu, as households grow some of their own rice, but primarily rely on purchased rice. Cassava, however, is a private enterprise that has spread widely throughout the area, and which has been embraced by farmers.⁷

Finally, political ecology tends to value social action (Bryant and Bailey, 1997), either from a policy perspective (Mehta, 1996; Kalipeni and Oppong, 1998), or from the perspective of social justice through applied research (Stonich, 1993). Research that analyzes food

changes, particularly if they suggest dietary deficiencies or monotony, lends itself to practical health and well-being applications. Action, however, must be carefully contextualized. This requires an in-depth consideration of the multiple voices, positions, perceptions, and experiences that help to shape individual and household access to diverse foods. This allows for the development of complex and possibly contradictory pictures of dietary issues. Rather than focusing dietary projects on large-scale analytical categories such as poverty, geographical isolation, or cash crop introduction, it is also necessary to examine the food-socioeconomics-environment connections that villagers themselves make. For example, advocating the reintroduction of millet cultivation to Thakkali Nadu would not necessarily improve staple dietary diversity. A nutrition-oriented project would also need to consider how to address environmental changes and water issues, household economic goals, and household labor requirements.

There are some questions that remain in the context of Thakkali Nadu, particularly regarding long-term food and economic security. Cassava income is used to purchase most household food supplies, in particular rice. Yet, cassava market rates can be highly variable, in some cases being half, or twice, the rate of the previous year. Additionally, the draining of soil nutrients is a reported problem with cassava (Baker, 1995), and this echoes local statements indicating that more and more chemical fertilizers are needed each year in order to grow a saleable crop. Consequently, it is possible, even likely, that relatively short-term agricultural decisions and coping strategies may in fact have negative longer-term food security, dietary diversity and nutritional status implications. These implications may be unforeseen by small farmers, although when questioned about food preferences, most villagers state that minor millets are both healthier and tastier and are the preferred food. Given that dietary diversity is a close analogue to dietary sufficiency, caloric intake, and nutritional status (Dewey, 1981; Hoddinott and Yohannes, 2002; Foote, 2004), questions of nutritional health in Thakkali Nadu merit further research.

These potential longer-term problems point to some of the additional complexities and possible contradictions that may shape local dietary transitions and food security. As I have demonstrated, a political ecology perspective allows for an explicit consideration of the contradictions that may be inherent in small farmers' experiences with and perceptions of the physical environment. This provides us with a complex and nuanced view of food contexts and, in terms of dietary diversity, adds to an emerging trend towards considering human health from a political ecology perspective. However, I do not wish to argue that there is only one political ecological approach to issues of agriculture and dietary diversity. This would

be in contradiction to the general research field, where a unified theory has been called unnecessary and potentially detrimental (Greenberg and Park, 1994). The political, environmental, and ecological factors shaping dietary transitions in other geographical and social contexts, such as among migrant farmers, sharecroppers, and landless agricultural laborers, are likely to be significantly different. This may particularly be the case when food and agricultural changes are considered from the perspective of government agricultural policies and programs.

Acknowledgments

I would like to thank Dr. Tina Moffat, the anonymous reviewers and the editor for their thoughtful comments on early drafts of this paper. I am most indebted to Dr. T. Vasantha Kumaran, Sister Francina, Ms. N. Annamma-devi, Ms. A. Chitra, Ms. Vimala Matthew, and Ms. Gracie Sevariammal for their invaluable assistance and support during the research process. This research received funding support from the Canadian Anthropology Society, the International Development Research Centre (Canada), McMaster University School of Graduate Studies, the Social Science and Humanities Research Council (Canada), and the Wenner-Gren Foundation.

Notes

1. See Logan and Moseley (2002) for some consideration of local economics and food security.
2. The name of this district is a pseudonym.
3. More widespread dietary recalls were attempted; however, this was an activity that villagers in all three communities were largely uninterested in participating in. The repetitive nature of the day-to-day diet led many people to state that the activity was a waste of their time. Nevertheless, the recalls do provide another indication of the paucity of millets—and prevalence of rice—in local diets.
4. Indicators of economic status include whether families have tile or thatch roofs for houses, whether they have electricity installed in the household, ownership of televisions, radios, and/or other electronic goods, and the amount of productive land that households owned and farmed.
5. There is little empirical data available on rainfall in the Kolli Hills. Rainfall is recorded at one station located in the central Hills near the main market town of Semmedu. Rainfall data are only available from 1991 onwards. However what data are available suggest that there has been a decrease of rain during April, May and June in particular. For example, in 1991, 144 mm of rain were recorded; in 1997, 37 mm; in 2001, 147 mm; and in 2003 33 mm. For May, 80 mm were recorded in 1991; in 1997, 65 mm; in 2001, 50 mm; and in 2003, 61 mm. In June of 1991,

- 213 mm of rain were recorded; in 1997, 81 mm; in 2001, 54 mm; and in 2003, 95 mm (Agricultural Extension Officer, Personal Communication, 2004). However, given the large area occupied by the Hills, and without systematic data from all over the Hills, and in Thakkali Nadu in particular, it is difficult to say how these data relate to local perceptions. This leads to a number of questions about farmer perception versus reality, particularly with regard to how rainfall is affecting agricultural decision-making, versus a desire for a cash income. These two aspects do not have to be mutually exclusive, but in the absence of rainfall data, the relationship cannot be precisely pinpointed, and in all likelihood would vary from household to household, and over time.
6. Eighth standard is the equivalent to North American grade eight, educating children typically 12–13 years old. It is considered lower secondary school in India.
 7. See Rigg (1987) for a discussion of similar circumstances in upland Thailand.

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