CHANGES TO AGRICULTURAL DECISION MAKING AND FOOD PROCUREMENT STRATEGIES IN RURAL PARAGUAY

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Abstract: This research note provides a preliminary discussion of changing agricultural and food procurement strategies in a smallholder farming community in Piribebuy District, Paraguay. Although considerable attention has been paid to the contemporary problems of soy agriculture in Paraguay, it is also important to engage with the experiences of smallholders who are not involved in or affected by soy cultivation, as this highlights farmers' diverse everyday experiences and their agricultural priorities. We consider three issues that have emerged as key to farmer agricultural decision making in this community: farmer perceptions of environmental changes, processes of dietary delocalization via the movement of food from urban centers to rural communities, and the intersection of labor issues and aging farmers.

This research note provides a preliminary discussion of some of the factors shaping the agricultural and food procurement strategies of smallholder farmers living in Lindo Manantial (a pseudonym), a community in the Piribebuy District, Cordillera Department, Paraguay. As part of an ongoing ethnographic research project looking into agricultural livelihoods and food procurement, we have thus far identified three critical factors that are helping shape agricultural decision making and food access in this community: farmer perceptions and experiences of environmental change, dietary delocalization and the movement of food from urban centers to rural areas, and the reality of aging farmers

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and agricultural labor requirements. We ask, what implications do these processes have for an understanding of the intersections of farmers' agricultural practices and dietary practices in Lindo Manantial? In addressing this question, we demonstrate that aging farmers make careful, strategic decisions about what food crops to plant to address complex priorities and limitations that can include climate considerations, reduced agricultural labor pools, and crop and dietary preferences. Finally, we discuss some coping strategies and innovations that are taking place as farmers strive to address livelihood and agricultural uncertainties.

Examinations of the strategies and experiences of Paraguayan smallholder farmers are timely, given ongoing agricultural and food tensions in the country and in the region. Paraguay has a history of inequitable land distribution and rural tensions (Nickson 1981; Nagel 1991; Weisskoff 1992; Turner 1998; Nagel 1999), and currently, 1 percent of the population controls approximately 77 percent of arable land (García-López and Arizpe 2010, 199). Basic food prices are rising (by 40 percent in 2007, according to Vargas [2008]), and the issue of soy production for export continues to draw national and international activist and academic attention. This is understandable, given that Paraguay is the fourth-largest exporter of soy (Fraisse et al. 2008, 1399). In 2009, there were an estimated 2.6 million hectares of soy produced (Corporate Europe Observatory 2009, 2), on approximately 10 percent of the available agricultural land in the country (García-López and Arizpe 2010). In departments where soy is a major economic strategy, the crop has raised a number of concerns, including violence against smallholders; monoculture and the loss of agricultural biodiversity; reports of high levels of pesticide use and the implications of this for human and environmental health; and smallholder displacement, because soy is so lucrative that it encourages land grabs and land consolidation (Altieri and Pengue 2006; Maeyens 2006; Brown and Weisberg 2007; Corporate Europe Observatory 2009; Hetherington 2009; Vásquez-León 2010; see also García-López and Arizpe 2010).

Yet 60 percent of Paraguayan farmers are smallholders (Vásquez-León 2010, 56), and farmers who are not directly or indirectly involved with soy agriculture are facing diverse agricultural experiences and struggles (see, e.g., Almada, Ferreira, and Miranda 2005; Vásquez-León 2010). Although some of these farmers may operate in cooperatives or other market-oriented agricultural practices, others primarily grow crops intended to feed themselves and their local communities. It is this last group of farmers, those who currently are growing crops primarily for their households and communities, who are at the center of our research.[1] It is important to examine the lived realities of smallholder farmers to gain an understanding of local-level agricultural struggles, barriers, priorities, and innovations. An ethnographic approach offers insight into both localized and broader processes that involve the movement away from agriculture as an economic strategy, rural-to-urban migration, agricultural transitions, and changes to dietary and culinary practices. That is, our research intersects with some of the region's diverse rural transitions (see, e.g., de la Cadena 1988; Ellis 1999; Escobal

1. This project was developed after initial consultations with farmers in Piribebuy District.

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2001; Jokisch 2002; Andersen 2002; Steward 2007; Isakson 2009) while adding to and building on understandings of agricultural livelihoods and local food systems in Paraguay.

COMMUNITY BACKGROUND AND RESEARCH METHODS

Lindo Manantial is located approximately seventy-five kilometers outside of Asunción, the capital of the country. Piribebuy District contains twenty-eight communities and has a population of approximately thirty thousand. Most of this population lives in Piribebuy town. Lindo Manantial supports approximately eighty-six households, which include everything from multigenerational extended families to small single-generation or single-individual households. Most households own some agricultural land, ranging from less than 0.4 hectares to approximately 16 hectares; most participants own 4 hectares or less. The quality of this land is variable, ranging from rocky and unsuitable for most crops to rich soil. Four participant households do not own any agricultural land.

It is relatively easy to get from Asunción to Piribebuy town via a well-paved highway and set of smaller roads. In other parts of the district, roads are not paved. Although these roads are largely passable, this can change with rainfalls that lead to washouts. Public transportation is limited, and even though the community is not precisely isolated, depending on the state of the local roads, it may take more than two and a half hours to reach Asunción by car or truck and more than an hour to reach Piribebuy town. Few people have access to private, motorized transport and typically depend on public buses.

Unlike smallholder farmer communities in some parts of Paraguay, Lindo Manantial is not directly affected by soy production. Soy is not grown in the immediate area, and farmers are not being pressured to sell their land to large-scale soy producers, nor are their crops being affected by the use of pesticides on soy latifundios. Moreover, participants do not have any interest in soy as a production strategy. Although they are aware of soy cultivation in other parts of the country, the uneven, hilly, and rocky land in Lindo Manantial is unsuitable for soy. Farmers also state that even if the land were suitable for soy, they would need considerable agricultural machinery, which they do not have and could not afford.

Instead, the primary crop in the area is mandioca (cassava), and in many cases it is the only crop that smallholders continue to grow. Mandioca plays a central role in everyday dietary and culinary practices, and it is a staple food. Households may grow other crops, including oranges and other citrus fruits, maize, coconuts, pineapples, and sugarcane; some households have small garden plots that support some vegetables and beans at different times throughout the year. With the exception of mandioca and citrus fruits, all these crops are grown in small amounts. In addition, agriculture is largely geared toward household use. Although agriculture is the central activity in the area, market-oriented agriculture is limited, in part because of the lack of reliable roads and transportation.[2]

2. Exceptions to this typically take place on a very small scale. For example, members of the research team would typically return to Asunción with purchased large bags of mandarins, oranges,

The first two fieldwork seasons took place in May–June 2009 and June–July 2010. Semistructured interviews, focus groups, and participant observation have provided insight into the local food system, agricultural strategies, and farmer decision making. Villagers were invited to participate in focus groups and interviews via face-to-face meetings and discussions; this was aided by preliminary project development discussions conducted with some community members in 2008. Two focus groups were conducted in 2009, one addressing food access and culinary practices, and another addressing agricultural decision making. Focus groups lasted between an hour and fifty minutes and two and a half hours. In 2009 and 2010, the principal investigator (Finnis) and a research assistant conducted thirty-three semistructured interviews with thirty-seven members (twenty-five women and twelve men) from thirty households. Interviews lasted between forty-five minutes and one hour, although it was not unusual for them to take more than an hour and a half. Some interviews incorporated participation in other activities, including walking to agricultural fields to examine crops, helping with crop or food preparation, and touring medicinal or natural pest-control gardens.

Most participants came from single-generation households, or households of parents and children, although in some cases households included members of three or four generations. For example, one couple were caring for their youngest children and some of their grandchildren while the parents were working in other cities or countries. In addition, more women were interviewed than men; this reflects the reality that men are more likely to take seasonal or long-term jobs outside of the community. Finally, twenty-four participants, men and women, were fifty years or older, with an additional ten participants between thirty-six and forty-nine years old. This skewed age distribution is an important characteristic of the community: most of the younger adults (those in their late teens to midthirties) migrate to cities or other countries to find work. Those who stay in Lindo Manantial and continue to work in agricultural fields are typically middle-aged or older.

The remainder of this preliminary report considers the factors that farmers identify as key to changing patterns of agriculture and food procurement in the community. We also discuss some of the strategies that farmers are employing to address this uncertainty and consequent household economic needs.

"THE RAIN IS PLAYING WITH US."

During a focus group on agricultural strategies and barriers, a man in his early fifties explained current environmental uncertainty as a kind of game played by the rain. "The rain is playing with us," he said, and his nephew, who farms his own land, went on to say that the current lack of rainfall predictability can mean

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or grapefruit. Some households sell small amounts of beans, peas, or other vegetables and legumes to others in the community. Pineapples are sold in season, including to people in Piribebuy town. One participant, a woman in her sixties, makes a living primarily by selling small amounts of excess mandarins, beans, and cheese to people in Piribebuy town, on behalf of a few households in Lindo Manantial. She takes these products to town via bus, once every eight days.

that hard work put into the fields is ultimately in vain when nothing grows. Such concerns were also commonly articulated during interviews. As one thirty-nine-year-old woman stated, "You have to wait for rain to plant seeds. We can no longer *know* when the rains will come, even in the months of rain. We have to wait."

Women and men also expressed concerns about changes in temperature patterns, in particular shorter periods of colder temperatures between periods of increasingly intense warmth that begin earlier in the year, even in September. For example, a forty-nine-year-old woman said, "In the past it was very hot in the summer and cold in the winter. . . . [I]n June it was freezing. Now the winter is warmer and the summer is much, much hotter." Even in the cold season, periods of intense cold were described as shorter. One sixty-four-year-old man put it this way: "Now it is not as cold. In the past it would be fifteen days of cold. Now it is a few days [of cold] and then it is hot again." This kind of description—shorter periods of cold, followed by warmer days—was common among participants, and these kinds of changes have implications for the kinds of crop decisions people could make, both in terms of crop development and in terms of labor requirements. For example, one woman in her seventies pointed out that too much heat means that peanuts may not develop an edible product, thus leaving the effort a waste of time and other resources. Moreover, aging farmers commonly noted that as the days get hotter, it is harder for them to spend long periods in their agricultural fields, which means that they are less likely to consider planting large amounts of crops or crops that require more labor.

Farmers state that shifting weather patterns—in terms of longer hot periods, shorter colder periods, and uncertain rainfall patterns—cause confusion, and thus they can no longer rely on traditional knowledge about when to plant crops to capitalize on expected weather patterns. Instead, they increasingly need to take a wait-and-see attitude, in which they try to assess the weather—regardless of established and expected patterns—when deciding whether to sow crops. Although a degree of weather consideration is necessary for all farming decisions, it is the lack of seasonal consistency that is causing confusion and concern. The concern about crop cycles extends to mandioca, a key staple. For example, in 2009, farmers stated that they were waiting to see if seasonal rains—late and scattered—would become more consistent before they tried to plant mandioca. Some were preparing fields while they hoped for rain, all the while stating that crops should have been planted and thriving already. One fifty-nine-year-old woman articulated her concerns with this when she discussed the fact that she and her husband sometimes need to buy mandioca tubers from market towns because they cannot grow enough. She said, "The climate has changed and there is no more rain. . . . [T]he mandioca is so small, it can't grow better."

FOOD REMITTANCES, DIETARY DELOCALIZATION, AND DIFFICULT AGRICULTURAL DECISIONS

Although purchasing food products such as oil, salt, and meat is not a new practice in the community, the reliance on purchased food is increasing. With the exceptions of mandioca and citrus fruits, many participants relied solely or exten-

sively on purchased foods for daily use. This included staples like maize (whole and ground), mandioca flour, and peanuts; beans and pulses; vegetables such as peppers, onions, potatoes, squash, and tomatoes; and beef, cheese, and milk. Purchased foods can be divided into two basic categories: foods that were never or were irregularly grown or processed by local households (e.g., noodles, oil, beef) and foods that have a history of being grown and processed by households (e.g., vegetables and beans, mandioca flour, maize, peanuts) but are declining in the local agricultural landscape. It should be noted that, although mandioca continues to be grown extensively in the area, it is rarely ground into flour (*almidón*). In the past, farmers would take their some of their mandioca to nearby flour mills. However, most of these mills have closed, and consequently, farmers do eat whole mandioca from their fields but they are more likely to buy packaged almidón. Thus, in general, villagers are not simply buying things that cannot be grown or processed; they increasingly rely on purchasing foods that are or were grown or processed locally.

Some of this may be available from tiny village shops or from some households in the community, but quantity and diversity, especially for fresh fruits and vegetables, is limited. A more diverse range of foods can be purchased in Piribebuy town. However, it is the transportation of food from urban to rural locales by adult children that demonstrates an important shift in food procurement. As small-scale farming as a livelihood loses its appeal and viability, and as people increasingly want access to commercial material goods that require regular incomes, adult children increasingly move to towns, cities, and even other countries to find work. This can sometimes be a temporary or semipermanent move, but in other cases it is permanent. These adult children are important in terms of providing either the money to buy food or the food supplies themselves when they visit the community on a weekly or biweekly basis.[3] When agricultural yields become problematic or unpredictable, urban-dwelling children become the primary means of ensuring rural household food security, via these food remittances. All of this points to a process of dietary delocalization (Pelto and Pelto 1983; see also Waldram 1985). In Lindo Manantial, farmer households are losing control over food-crop production when it comes to a range of food products. This increasing reliance on food purchased in urban centers demonstrates a reversal of traditional ideas of the movement of minimally processed or fresh food between rural and urban centers.

A case illustration of one household demonstrates the ways that labor and environmental concerns can intersect in complex ways to shape decisions about what to grow and what to buy. This couple, a woman in her seventies and a man in his early eighties, maintain a farm of approximately ten hectares; most of their adult children have moved away from Lindo Manantial. This means that the couple are largely responsible for agricultural and household labor, and they must make strategic decisions about how much land to cultivate and what to grow. When

3. In one case, a family periodically receives groceries paid for by a son living outside of the country. He sends money and a list of supplies to a store in Piribebuy town and pays for the delivery of the supplies.

asked about food procurement strategies, the woman stated that, among other things, they always buy maize: "About ten years ago we stopped growing maize. We stopped growing it because the rain was not good and we would have to pay someone to harvest it. It is better to buy the maize than to pay for harvesting. . . . The work is the most important reason. . . . We get money from our son who now lives in [a border city with Brazil], so this is how we buy the maize."[4] The fact that this couple can purchase maize at a cheaper rate than they can produce it points to a salient aspect of the demographics of the community. As farmers age and adult children move to urban areas for economic and lifestyle reasons, local agricultural biodiversity and food production become constricted. In this household, a limited labor pool has also contributed to the decision to stop growing peanuts. Peanuts are a preferred food in this household, and they play a central role in the household diet, including ensuring a feeling of fullness after a meal. In the past they grew peanuts, but labor requirements and environmental uncertainty mean that they now purchase peanuts.

At the same time, this couple continues to cultivate mandioca. Mandioca cultivation is a priority because of their perceptions of taste and health. They conceptualize locally grown mandioca and locally processed almidón as healthier than mandioca grown elsewhere, particularly in Brazil. The husband in this family put it this way, "You can eat just a little bit and you are full," and he argued that mandioca grown elsewhere is contaminated with pesticides, which has negative implications for human health. His wife felt that in addition to these problems, "the ground here is better than in Brazil, so we can grow a better kind of mandioca," one that is tastier and better for the body. This local-imported juxtaposition extends to visual and tactile considerations—the couple considers the grittier texture of local almidón and its rich, creamy color signs of quality and healthfulness.

The agricultural decisions this couple makes point to a complex set of priorities and limitations: labor limitations, climate considerations, access to money to purchase food, taste, and notions of health all come together as they make difficult agricultural decisions that reflect changing household circumstances and composition. We also note that notions of local food being healthier were not limited to this couple. Focus groups and interviews, particularly those with women, indicate that participants are aware of the reliance on pesticides among market-oriented, large-scale farms. For example, á focus group with thirteen women, age twenty-four to seventy-two, on food access and culinary practices, clearly articulated the health-local relationship. All the women in the group argued that food they grow in their fields and gardens is healthier because they do not use insecticides or chemical fertilizers. In contrast, they felt that food from "outside" (particularly if imported from Brazil or Argentina) is grown with pesticides and other chemicals and is therefore contaminated. Participants were worried about the use

4. The issue of labor can also relate to preparing food for cooking. In this case, the household purchases maize that still needs to be ground by hand, which is a time-consuming activity that can also be physically taking for older individuals. Thus, although purchasing maize may reduce agricultural labor, this is not necessarily the case for some aspects of household labor.

of pesticides and the implications this would have for the health of their children or grandchildren, and they recognized that they are able to control pesticide use only when it comes to their own land. This is something that is presented as a key difference between agricultural practice in Lindo Manantial and the practices of people who produce food for markets. As one woman put it in a later interview, "People who produce for sale use chemicals. Here it is completely natural."

DIVERSIFICATION ACTIVITIES, MARKETS, AND SOME THOUGHTS ON ONGOING RESEARCH

"Climate change," one farmer in his early fifties said, "creates confusion for all the producers." Although concerns with the environment and climate unpredictability certainly reflect an increasingly common trope both globally and in Paraguayan contexts, perceptions of such changes intersect with the realities of the rural-to-urban movement of labor, agricultural competition, and the increasing household reliance on purchasing food or receiving food remittances. As farmers continue to cope with confusion about climate patterns and changing labor availability, the ability to enact diverse agricultural strategies can become important to household economics and food practices. One man, for example, suggested that if cold periods continued to be shorter, then some crops that are less resistant to cold might do better in the future. Others view milk and cheese production as an important way to diversify income and dietary strategies. For example, several (related) households have started milk and cheese production in the past five years, combining knowledge about cheese making with the required resources and labor inputs. As one household member put it, they are changing strategies as a result of poor rains by concentrating more on milk and cheese making and less on growing crops. This diversification strategy is an important measure of both food and income security. In times when agriculture is good, these households are able to get staple foods and even some vegetables such as squash from their fields, and they make cheese that they can eat and also sell to local community members. When growing conditions are less predictable and less successful, they still have milk and cheese to eat and sell, which allows them to buy food supplies.[5] This kind of strategizing points to the innovative capacities of farmer households and the ways that control over agricultural practices can be reshaped and reasserted even in uncertain times. At the same time, this particular strategy depends on access to physical resources—specifically, the land on which to graze cows and the money to purchase them. Dairy cows cost more than Gs. 1,500,000 (approximately US$300) each, which must be obtained from adult children who work in urban centers. Thus, farmer innovation and strategizing is taking place, but it is also important to recognize that this relies on support from outside of the community.

Another innovation we have observed is the creation of a hybrid citrus variety. One man spends considerable time grafting seedlings to make a unique orange

5. A handful of households produce milk and cheese for local sale. Urban visitors to the community might also sometimes buy cheeses, which are usually made in blocks of more or less a kilogram in weight.

with a mild, sweet flavor and a green rind. However, this activity, which requires skill, time, and a dedicated plot of land, is not directed toward a market, as there are no structures available to bring such seedlings to a wider public. Instead, the hybrid plants are sold to local households that want access to this particular variety. This is part of a larger problem when it comes to market accessibility for smallholder farmers, both physically and in terms of prices and competition. Lindo Manantial's fields, roadsides, and homesteads are full of citrus trees, including at least three varieties of oranges, mandarins, lemons, and pomelos. Although household members steadily consume the fruits throughout the season, the sheer number of trees means that there is considerable waste. It is common to see fallen and rotting fruit surrounding trees. Quality and flavor are high, and organic pest-control methods are used, but growers do not regularly send citrus fruits to market. One woman, in her late forties, succinctly pointed to a key problem when she said that truckloads of citrus fruits are imported from Argentine citrus plantations, and local farmers cannot compete with those large plantations. Moreover, citrus is heavy, and in the absence of trucks (not available), or intermediaries (uninterested because of price issues), citrus fruits are too cumbersome to transport in large quantities. These accessibility and cost issues can intersect with broader environmental uncertainties. In 2009, one man put it this way: "It's too hard to sell oranges, because they are not good quality due to the rain. And it's too expensive to bring them to market—they are very heavy." In 2010, a woman in her midsixties stated that the oranges on her trees are small and not very sweet because of lack of rain; she did not eat or sell them for that reason.

Ultimately, our ethnographic research is ongoing to gain a deeper understanding of farmers' agricultural and food transitions in this part of Paraguay, and it has implications for considering the multiple dimensions of food security and food sovereignty in this community. Thus far, our research in Lindo Manantial has demonstrated some of the complexities and considerations that go into agricultural decisions and food practices among smallholder households as farmers attempt to negotiate environmental and economic structures over which they have little control. Our examinations of smallholder agricultural decision making have highlighted how the environment, aging farmers, and reduced labor pools contribute to local agricultural practices and to processes of dietary delocalization while also demonstrating farmer concerns, priorities, and preferences about which foods should continue to be grown and how to grow them. This points to some of the factors that influence the possibility of control over local food and agricultural systems, both in terms of staple crops and foods and in terms of a range of fruits and vegetables.

At the same time, we have found some economic or agricultural diversification strategies, and in doing so, we have highlighted that these strategies are linked to access to external resources, including off-farm work and money or other forms of support from adult children no longer living in the community. Similar patterns of off-farm support for rural households have been found in other locations in South America (see, e.g., Janvry and Sadoulet 2001; Ruben and Van Den Berg 2001; Jokisch 2002; Nygren and Myatt-Hirvonen 2009; Isakson 2009; Yarnall and Price 2010). Yet although family networks provide an important source of support, they

cannot be the only ways that farmers engage with alternative agricultural strategies. Farmers' experiences have pointed to the need for access to strong market networks and information that will help them address the climatic unpredictability they argue they are experiencing.

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