

Survival Strategies of Small and Family Farmers in the island of Puerto Rico

Introduction

Agriculture is an important part of Caribbean identity and national security (Weiss 2007, de Janvry and Sadoulet 2005, Pretty, Morrison and Hine 2003, Conway 2002, Dietz 1986, West and Augelli 1966). Despite this, agriculture, particularly in the Hispanic Caribbean, remains understudied, and the importance of smallholder agriculture has given way to other national priorities, such as tourism and conservation (Martin 2007, Rocheleau 2001, Weiss 2007, Heath 1988). Tourism and the biodiversity conservation discourse qualify agriculture as an inefficient use of land for Caribbean islands, with more desirable options elsewhere (Hope and Balfour 2006, Grau, Aide, Zimmerman, Thomlinson, Helmer, Zou 2003, Conway 2002). Agriculture's contribution to the national economies has been decreasing in the years since trade liberalization, and smallholder farms have been decreasing all over the Caribbean (Carro-Figueroa 2003, Greenberg 1997). Current economic policies favor large landholders to focus on economies of scale, thereby increasing the difficulties that smallholders face. International agreements are further driving out smallholder farmers as production costs become too high to compete with low cost imported goods (Martin 2007). Based on this situation the main research questions for this paper are: **How are smallholder farmers surviving?** and **Should smallholder farms survive given the current discourse?**

Social Networks and Sustainability

Historically, small farmers were considered highly sustainable (Netting 1993, Bebbington and Carney 1990). Even in the Caribbean plantation economies, laborers maintained their own plots of land where they experimented with multiple agricultural varieties of foodstuffs (McCook 2004). Conway's (1997) work addresses how small islands of the Caribbean remain resourceful, despite external domination and government mismanagement. Scott (1990) describes a similar

resourcefulness to the one that Conway (1997) notes for the Caribbean, as part of the “arts of resistance” as he questions the hidden meaning of farming in the face of overwhelming odds. The simple act of farming becomes an everyday act of resistance (Scott 1990) as government policy, conservation agendas, and economic development set farmers on a path to extinction to give way to capitalist wage labor (Korovin 1997).

Netting (1993) suggests that family and smallholder farming is more sustainable in the long run based on community property, ecological knowledge, and implicit social contracts. However, the Caribbean in general has undergone a modernization strategy following the pattern of the plantation system that eliminated a large part of local knowledge (Hope and Balfour). Ryder’s (2002) research in the Dominican Republic suggests that smallholders have become individualized, or been in that particular landscape for only a few generations, hence, they lost or never had local ecological knowledge.

Presently, smallholder farms in the Caribbean are labeled as inefficient and environmentally unsound (Ryder 2002, and Sambrook, Pigozzi, and Thomas 1999). Environmentalist discourses have been used to justify the removal of people from land considered high priority for conservation, or to rationalize land abandonment as a benefit for reforestation purposes (Rocheleau 2001, Grau, Aide, Zimmerman, Thomlinson, Helmer, Zou 2003). The global conservation priority, coupled with the Caribbean’s colonial history, explain how small farmers are often overlooked in planning strategies (Heath 1988). Despite these patterns, Siegel and Alwang (2004) in their World Bank report on farming in the Dominican Republic stress that for environmental protection and poverty amelioration, the government must focus on rural development, and draw from the techniques farmers have developed to maintain their livelihood. Further, deJanvry and Sadoulet (2005) emphasize that to achieve development, there must be an integral approach that incorporates rural survival strategies and networks.

These reflect the academic literature produced in cultural / political ecology revolving around the discriminatory, and ultimately failed, policies of conservation that divorce people from their land.

The role of smallholder regional networks, reciprocity and family structures, plays a critical part in small farmer survival and management (Netting 1993), but has not been the central focus of recent rural research. Recent research has focused on niche markets and income diversification, for the adoption of improved land management practices, and the survival of small landholders in an increasingly globalized economy (Jokisch 2002, Zimmerer 2007, Steward 2007). Madsen and Adriansen (2004) state that recent research in geography leaves most of the dynamic world of land use by rural actors unexplained, calling for renewed attention to the physical and philosophical research of rural areas. As regions are shaped by social actions (Jarosz 1996), this research illuminates the networks used by smallholders and the degree to which farmers shape the highly diverse landscape in which they live, thereby creating the Caribbean agricultural landscape.

Biodiversity Conservation and Ecological Sustainability

The farmed landscape comprises up to 30% of the world's surface. Of this 30% about 10% is farmed intensively and 17% is farmed extensively. However, under the broadest definition of farming, as much of 70% of land area in the world is under some type of agricultural use (Scherr and McNeely 2002). The farmed landscape and current trends of conservation seem to be on a collision course as the urgency to fence off areas against agriculture increases (Vandermeer and Perfecto, 2006). The focus has begun to change in recent years as the homogenization of diets and crops has led to a noticeable loss of agricultural diversity and its associated natural biodiversity (Brush 2000, Ambrecht and Perfecto 2004). Biodiversity conservation has long focused on natural landscapes untouched by human activity (Zimmerer

and Carter 2002, Brush 2000). This mentality is particularly problematic as it generates from the perception that humans do not belong in forests (Rocheleau 2001). The shift in the Americas to the urban and forested landscapes dichotomy, has led to increasing land pressure for conservation and agricultural land abandonment for reforestation, particularly in the densely populated islands of the Caribbean (Aide and Grau 2004, Zimmerer and Carter 2002).

With 45% of the Caribbean under protected area status, local adaptations of food varieties, plant uses and land management are being lost under the banner of reforestation and development.

The major problems affecting small farms are the increasing intensity of production based on homogenization of production systems and the homogenization of diets in general (Rossett 1999, Brush 2000, Scherr and Mcneely 2002). As GDP increases land tends to be consolidated in fewer hands showing a decrease in small farming all over the world (Dao 2004), and certification strategies, which seek to incorporate small farmers into the global market, may result in a decrease of biodiversity (Ghazoul 2001). Much of the development that occurs is based on the US model of commercial agriculture, and agricultural research is generally based on “scientific” rather than local knowledge (Bebbington and Carney 1990). The decrease in diversity of diet and cultivated crops may decrease the tools for adaptive tactics and strategies that farmers may use (Perramond 2007). Use of chemical inputs, homogenization of planting strategies reduce the amount of revenue farmers get from their land, increase dependency on outside sources and ultimately lead to a decrease in overall farm productivity and soil quality (Altieri 2007, Rossett 1999, Aviles-vazquez, unpublished).

Hypotheses and goals of this research

This research examines how smallholder farmers stay in production and decrease costs by utilizing social networks and ecological services to survive in the shifting Caribbean economy.

Documenting potential positive impacts of small scale and family farming on local landscapes.

The goal of this research is to determine the relative success of social and economic strategies used by small landholders in the Caribbean to remain in agricultural production. Specifically, my research will address how rural space is used and what changes are occurring given the increasingly globalized world and impending application of DR-CAFTA trade agreement. This research is based on the following working hypotheses:

1. Smallholder agriculture is being maintained through innovations outside the formal economy and social / family networks.
2. Smallholders provide social and ecological services that reduce poverty and increase sustainability, which enhance current conservation agendas.

Description of Study Site

The Caribbean islands' economies were developed mainly as a benefit to the mercantile western empires and are now shifting towards more service and tourism economies (Conway 1997). Puerto Rico is the smallest of the Greater Antilles located in the Caribbean Sea. It has a slightly different development path than other Caribbean islands. For example, when other Caribbean islands focused on sugar, economies of scale benefits of sugar did not apply until to Puerto Rico until after the US occupation in 1898 (Bergad 1978) culminating in the cane strikes of the 1930s. Afterwards, US interests shifted the economy to manufacture while under Operation Bootstrap, the economy shifted almost completely away from agriculture (Carro-Figueroa 2003). The current narrative in the island is that of the imminent disappearance of agriculture, greatly influenced by government policies that continue to ignore smallholder farmers (personal conversations). The island has a central mountain range in which smallholder agriculture is practiced and coffee is produced as the cash crop in a multi-cropping system (Carro-Figueroa 2003).

After the period of Operation Bootstrap, the forests and agricultural landscape of Puerto

Rico went through a period of rapid change characterized by farmland abandonment and forest recovery hailed as a victory for development in the island (Grau, Aide, Zimmerman, Thomlinson, Helmer, Zou 2003), evidenced by the decreasing share of the island's GDP coming from agriculture. While the majority of the producers in Puerto Rico are small farmers, most of the agricultural land belongs to larger agricultural operations (Carro-Figueroa 2003). The majority are located in environmentally sensitive areas (Aide and Grau 2004, Rural Census 2002). In Puerto Rico, only 1% of the GDP and 3% of the labor force is employed in agriculture (CIA World Factbook 2008) however, the concentration of agricultural labor and contribution of the agricultural sector to the economy at each steps in the production process have never been studied and are estimated at more than 30% of the island's GDP (Sub-secretary of Agriculture 2007).

Today, the Dominican Republic is the only Caribbean island to be included in the Central American Free Trade agreement (DR-CAFTA, Morley 2005). Puerto Rico will be directly involved with DR-CAFTA as a territory of the United States bound to the same laws and trade agreements. This trade agreement is likely to deteriorate the conditions of small farmers in the Dominican Republic and Puerto Rico, as they are already highly dependent on government assistance and are forced to sell their products below production costs (Siegel and Alwang 2004). All of these variables, combined, make this a critical time to study and understand the methods that farmers use to survive and manage their landscape in the long-term.

Methodology

This study draws strongly from the progressive contextualization of Vayda (1983) and grounded theory (Glaser and Strauss 1967). The researcher used multi-sited ethnography as designed by Marcus (1995) using semi-structured interviews to place the farmer and rural use at various scales. People, and discourses were tracked across scales to reveal social networks and

interpersonal relations that directly shape the agricultural landscape in a multi-sited ethnographic analysis (Marcus 1995). Ethnographic interviews were semi-structured and geared towards farmers values, practices and techniques used to stay in production. To address the criticism, that rural geographical research has moved away from farming (Morris and Evans 2004) the researcher focused on agricultural activities, but encompasses all others that impact the time and energy devoted to farming. The interviews trace what farming practices are currently used, and which ones have been abandoned. Based on the interviews, the researcher will ascertain what is the discourse surrounding the ecosystem services the farmers may be drawing upon. The researcher then draws upon the extensive literature on small farm soil quality and land management to compare discourse with the efficacy of adopted or retained practices. Through the interviews the researcher will also investigate what are the attitudes of people towards the land and what methods are employed, if any, to diversify and improve crop production or sustainability.

Results and Discussion

Research conducted in 2007, suggests that farmers, despite having lost “traditional” knowledge due to the intensification of agriculture, are relearning ecological farming techniques that are beneficial to crop production or retain practices that decrease household costs. Farmers are not merely victims of an imposed modern system, they adapt green revolution technologies to local realities often challenging the very scientists that provided the technology.

Farming households survive using a variety of cropping techniques and an ecological diversity that has been studied particularly close to the house (Winklerprins and Souza 2005 and Kimber 1973). However, unlike previous research, which delimits an area as housegarden, this research suggests that the border between the house garden and the “farm” is porous with useful trees and other plants interspersed within the cash crop for use in the house.

This researcher's findings in Puerto Rico suggest that, after a period of trial and error, farmers reject modernization strategies that pose no greater benefit or income than their current method of production. Simultaneously, she found that farmers are relearning ecological forms of management as economic hardship increases to decrease costs of production or increase the benefits drawn from the farm. Lastly, she found that, aside from migration and income diversification, farmers in Puerto Rico are still highly dependent on social networks to survive.

Households tended to have a "traditional" distribution of labor with the women administering the finances of the farm and house, and the men doing the physical finca work. When crops were not reliable the women's housework would be shifted from the private to the public sphere and the household income would rely more heavily on women's sewing, cooking and plant selling. When no women were present single men used migration as the general strategy to deal with times of little to no income. Though households seem to have the "traditional" division of labor, households shift who performs specific functions based on its composition. Women tend to be administrators, however, they know how to run the farm and can perform the physical functions of the *finca*, and in fact take over the labor when the husband falls ill or dies.

Small and family farmers rely on family and friends labor to survive in the increasingly costly agricultural field. Households of single men had other members (such as an uncle) perform the duties of house administration and sisters in the city would cook to compliment the uncle's work. Single women relied on children for any non-farm related need, but the tendency was to take on farm work in addition to the house labor already performed by the women. Families stay in the farm as they grow and increase their costs by increasing the amount of houses built, these increased costs in building materials seem to be offset by available onfarm labor, and help with the construction itself.

Preliminary results addressing both questions of how and should farmers survive suggest that farmers use a multiplicity of networks as each individual network has become limited and harder to reproduce or replace. For example, after a few weeks working his friends in exchange for food, a farmer had to stall his greenhouse project to wait a couple of months until “it was not too much abuse” to keep counting on his friends.

Smallholder farmers are engaging increasingly in informal economic activities to remain viable, such as bartering and work reciprocity. Bartering and reciprocity are a major form of expenditure decrease. Informal loans, are another type of expenditure decrease. If things get hard on the meat market for example, loans will be taken out on small calves to be paid back later with the calf fully grown and pregnant (interest). With the increasing cost of land, young people interested in farming have a hard time acquiring land, for this reason some have resorted to exchanging their labor to the use of land.

A common expression among farmers is that the only way to survive is “outside the system”. From the youngest to the oldest, more and more farmers are actively seeking ways to get off the system. Relying more heavily on outside methods of energy production and food. Most food staples come from the farm itself with the exception of rice, which in itself has a complex political history of why it did not become a main crop in Puerto Rico. Some households rely on building materials from the farm itself to make improvements and build more areas, or people’s ingenuity on getting “off grid”. A farmer whose son was a mechanic had fully installed rotating solar panels, reducing electricity costs to nearly zero.

Getting government payments or aid, has become an intricate dance, as farmers have learned to agree to agronomists recommendations while not following them in order to get payments or much needed insurance. While a large proportion of farmers would qualify for government assistance, only a small proportion actually does go through the trouble preferring to

have nothing to owe the government. These efforts to receive their due incentives or subsidies from the government did not suddenly appear, the Puerto Rican government has been delayed in payroll payments to rural workers by 9 months, and on reimbursements to farmers' investment by years, farmers see the loss of days of work to a non-guaranteed payment from the government as highly inefficient.

Agriculture is a highly charged political issue as the island's food security is seen as an integral part of any path towards independence. Nevertheless, farmers from either extreme of the spectrum from annexation to complete autonomy stated that to go out everyday and farm was to "resist" because they view the government as against them, and wanting them to disappear. The practices of the government recently support this view. Conversations with the department of agriculture support that government initiatives are focusing mainly on large farmers.

While retired farmers compliment their farming with pension plans or social security aids, middle aged farmers are engaged in two jobs, getting up early to tend the finca going to work a full time job and coming back to work on the farm. Despite the claim that there is no one going into agriculture, younger Puerto Ricans and foreigners are taking up agriculture as they see its critical importance in Puerto Rico's political and economic future, independent of political affiliation, but entry is increasingly difficult.

Land use practices have changed considerably in the past decade, in the 1960s and 70s complete modernization of production led to an almost complete elimination of shade trees in coffee and intercropping strategies. Today's rural landscape is highly changed, farmers engage in increased planting of trees beneficial to coffee, reapplied or kept under the radar intercropping techniques they used, and they devise and experiment ways to decrease or eliminate completely use of chemicals, which have become prohibitively expensive.

Financial stressors as well as other factors allow for a large amount of each farm to

remain fallow increasing the heterogeneity of landscapes. Within farms diversity of landscape provides a heterogeneous habitat that may be, based on the literature, of great use to biodiversity. Some of these ecologically beneficial cost-reducing alternatives are the use of living fences. Living fences rely on cutting trees from the farm and using them to fence off the farm preventing theft and intrusion at almost no cost. Ornamental plants were historically used to delineate work areas, some farmers still use these ornamentals, but once fully grown sell them to the US market which sometimes generates more income than the crop itself. Fast growing water absorbent trees are placed in areas that tend to oxidize due to water accumulation, increasing the arable land in the smallest land area. Other trees and plants are kept as endemic, being culturally significant or having uses or edible characteristics that will be useful if Puerto Rico is ever “cut off” from its major suppliers. The fear of being cut-off, reverberated across scales from the smallest farmers to the department of agriculture. This conscious conservation of diversity though general is rarely recognized and supports Zimmerer’s work on increased on-farm biodiversity.

Multiple varieties of plantain, banana, and coffee that resist weather extremes have been developed in the mountain region. Lately, government incentives are focusing on the larger landholdings on the coast, which use a particular variety of banana and plantain. Loss of this biological diversity of crops adapted to the mountainous topography of the island would increase food insecurity of the island and, some speculate, would lend these varieties to go the same route as sugar cane. Hundreds of sugar cane varieties were developed for the particular climate and terrain of Puerto Rico, while a few varieties are being used in Hawaii and Colombia, demonstrating the broad applicability and use of different seed stocks, these varieties were almost lost, except for a costly government effort to preserve them in an experiment station (Sub-secretary of Agriculture 2007).

Innovation is not limited to biodiversity generation, after a farmer lost her year’s work

due to an erroneous recommendation by an agronomist, she designed her own terrace system that followed the natural gullies in her property, though she continues losing some of her crop when it rains excessively, it is below past losses, and compensates for the lost government aid and insurance of not following the agronomist's instructions. The rural areas also present an example of ultimate recycling, all scrap materials are used in one form or another. Junked cars are turned into ways to move around the finca, and even found gas tanks are potential footbridges.

Ways to sell the product also fall into this category of innovation as value added products are sold instead of "just the fruit". One farmer is using a new variety of pineapple (no longer favored in the large fincas) and turned it into a delicious dessert, while people came and went from the produce kiosks, the line to his kiosk did not decrease throughout the day. Further, he sells at places not generally associated with agriculture, such as flea markets, effectively eliminating any potential competition.

Conclusion

This research centers analysis once again on the farmer and agricultural practices used in rural areas. By recentering research on these networks, it is evident that despite income diversification, farmers would not be able to survive without these reciprocal social and family networks and that community livelihood and integrity is critical to maintain a healthy farming community or to achieve integral development. Future research should also focus on agricultural middle men, named multiple times as a general reason for low prices, and women studies underway in rural sociology to observe how women's labor increases with increasing labor outside of the private sphere.

Despite multiple attempts by western trained agronomists at eliminating locally adaptive practices, farmers are starting to reapply practices used in the past leading to the expression: "the future of farming is in the old ways". Farming provides food for the family's consumption, even

when no crop is sold, an escape valve generally not available in the city, if the nature, non-nature conservation paradigm is to be applied. The farm also provides housing for family members that would have otherwise ended up “in urban ghettos”.

Survival of the mountain landscape and emphasis on its recovery begs the question of recovery towards what landscape. Agriculture has dominated the mountain landscape for hundreds of years, in some areas, loss of agriculture has led to loss of the mountain ecosystem that was the original conservation goal (Khanal and Watanabe 2006). Further, it is necessary to view agriculture as a buffer to the local economy, an important part of food security (already low for Caribbean islands, Conway 2002) and it is imperative not to classify all agriculture in the same category.

The recent approval of DR-CAFTA, and its potential impact on small farmers, has led to a general call to move beyond a commodity specific model (Siegel and Alwang 2004) that is still the goal of Caribbean governments for agriculture. Not only does this research show some of the positive benefits of smallholders in Puerto Rico, but the highly detrimental effects of development models imposed from a different cultural and physical landscape, as evidenced by the rapid decline in farming after Operation Bootstrap, and the hardships faced by current farmers relearning old methods.

Implications of this research extend to other island nations, areas of development, land use management, and policy towards alleviation of poverty, what Bebbington (2001) calls the linking of international actors through local networks. Farmers see their situation as a form of resistance to government initiatives that, from their perspective, focus on eliminating them and / or favor large farm owners in the coast. Farming in Puerto Rico is surviving, and despite political and economic pressures in Puerto Rico rural abandonment seems to have stabilized (Carro-Figueroa 2003). However, if these remaining networks are further stressed by free trade

agreements, which lower local food prices, loss of farmers and regional food security will decline even further.