“When Hurricane Georges came through back in 1998, we lost a lot of trees. Our canopy trees fell and crushed the cacao trees,” Hugo tells me. We’re sitting in the shade of a cacao tree with three other cacaocultores in San Francisco de Macorís, in the Dominican Republic. All four are members of a local cacao growers’ cooperative and generously agreed to spend a day with me, showing me around their farms, where they grow cacao trees in the shade of taller trees that produce timber and fruit, as well as enriching and stabilizing the soil and providing habitat for native birds and insects. They patiently answered my questions about agroforestry, hurricanes, and biodiversity and fed me copious amounts of fruit, joking that a cacao farm is better than a grocery store for finding snacks.

At the mention of Hurricane Georges, they all jumped in with their memories and observations. “Georges killed a couple hundred people,” Pedro added, “and it destroyed around 50% of the island’s crops.” I asked the group what happened after Hurricane Georges passed, whether farmers like themselves were able to replant their crops or trees and resume production the next year. “Some did,” Marisol explained, “especially those of us in cooperatives, where we had community support and help getting going again. But some people gave up and left their land. Especially because with cacao, you won’t get a crop right away; the tree has to mature first.”

This observation lies at the crux of my interest in agriculture, environmental shocks, and land use trends in the Caribbean. Small-scale farmers in the Dominican Republic and other Caribbean islands face recurrent environmental disturbances in the form of hurricanes. These hurricanes cause mortality and direct damage to property and fields, reducing agricultural production in their immediate aftermath. For my dissertation, I am studying the impacts of hurricane strikes on small-scale agricultural production, examining whether the catastrophic damage and losses from hurricanes drive land abandonment and forest transition in the Caribbean, a process in which farmers cease their activities, and in the absence of direct land management, secondary forests grow on land that had been used for agriculture. Caribbean forests form part of a global biodiversity hotspot, where high levels of endemic species are threatened by habitat loss due to deforestation for agriculture, livestock, tourism, and urban development. So agricultural land abandonment in the Caribbean simultaneously threatens rural communities and local food security, while also potentially expanding habitats for native species. I am interested in these two potential consequences.

During my trip to the Dominican Republic, I met with farmers, nongovernmental organizations working on rural development and biodiversity conservation, and academics to learn about recent trends in land use and conservation in the country. These conversations were a valuable opportunity to get feedback on my research questions and gut check my hypotheses about the connections between environmental shocks (like hurricanes), land abandonment, and reforestation. Farm tours and conversations with producers from cacao and coffee growers’ cooperatives were especially rewarding, as they gave me the opportunity to learn directly from people with deep knowledge of agroforestry in the region.

My conversation with Pedro, Marisol, Hugo, and José stands out in particular: their explanation of the role that their cooperative plays in their lives, with the social and economic connections and support that it provides, reinforced for me the role of institutions in mediating the impacts of shocks (be they environmental, like a hurricane and pest outbreak, or economic, like a change in trade policies). While I had read about the role of local institutions in increasing resilience to shocks in academic articles, I had underestimated this factor in my initial conceptualization of the processes at play linking environmental disturbances to land abandonment. The members of the cacao cooperative demonstrated to me the very real impact of the cooperative in their lives. This insight will influence my research approach as I move forward with my data collection and model development. Over the next few months, much of my

research will involve using large geospatial datasets and remote sensing, far removed from the face-to-face conversations I enjoyed during the summer; my trip to the Dominican Republic will serve as a strong reminder that not all the important factors in a complex social-ecological system can be identified and measured through satellite images.

In addition to hurricanes, the farmers I spoke to stressed two threats to rural communities in the Dominican Republic. The first is the increasing age of the rural population: more and more young people migrate to the cities for work, leaving the older generation in the countryside. The other threat is poor land use planning: as a coffee farmer in San Cristóbal Province explained to me, "The government is sowing the best farmland with cement and harvesting cities and airports." In his view, some of the prime agricultural land in the country is being converted to urban areas for the island's growing population and for airports and hotels for the tourism industry. This underscores the immense pressures on the limited land areas of Caribbean islands, where competing land uses threaten both biodiversity and rural livelihoods.

In light of the pressure on land in the Caribbean, I am particularly interested in the trajectories of abandoned farmland. When someone stops farming, what happens to the land? Under what circumstances does someone else buy the land and start farming, either with the same crops that were grown before or with different crops? When does the land get developed for the tourism industry or urban growth? And when and where does forest regenerate on abandoned land? And how does this process vary depending on the type of agriculture that was practiced previously?

Groups like Grupo Jaragua, Enda Dominicana, Sur Futuro, and the Centro para el Desarrollo Agropecuario y Forestal (CEDAF), four nonprofits I met with while in the Dominican Republic, are trying to address the issue of land use change and the aging rural population. All four groups see agroforestry as a potential way to restore land that has been degraded by intensive agricultural activity or grazing, turning it into productive farms that can support native biodiversity. As climate change is predicted to increase the intensity of hurricanes in the Caribbean, it is important to understand the social and ecological resilience of these agroforestry systems to hurricanes.