# REFLECTIONS ON DEVELOPMENT AND AGRICULTURE THROUGH THE LENS OF PEACE CORPS EXPERIENCE IN THE COMOROS ISLANDS

A Capstone

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by

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ABSTRACT

This capstone paper is a reflection on the experiences of a returned Peace Corps volunteer and student in the Global Development program at Cornell. Definitions of development and their reprocussions are examined in comparing various characteristics of the Comoros Islands and United States. The context of agriculture in the Comoros from an over-arching statistical standpoint and in light of a case study in Wanani, Mwali is presented. Agroecology as a means of agricultural and social development is posited. Questions meant to to stimulate community dialogue in Wanani are enumerated along with questions for communities in the United States.

## BIOGRAPHICAL SKETCH

Julie Cardon was raised in Utah and attended Brigham Young University as an undergraduate, where she attainted a B.S. degree in Conservation Biology, with an emphasis in resource conservation (botany), and a minor in International Development. In spite of enjoying a post graduate internship with the Bureau of Land Management in Elko, Nevada, a dislike for deskwork and bureaucracy, and a meaningful stint volunteering in an afterschool program prompted Julie to return to school, this time at the University of Utah to earn a Master of Arts in Teaching, along with a Utah secondary teaching certificate in the biological sciences. Julie was fortunate enough to land a job teaching science at Alpine Academy in Erda, Utah, where she taught for 11 years. Spending time caring for a small orchard and garden she built with her students pushed her towards considering a second career in Agriculture. Wanderlust led her to seek out a position as a Peace Corps volunteer where she could learn about agriculture firsthand from people who farm for a living. She chose the Comoros Islands as an ideal location for such a pursuit and was stationed there with the Peace Corps from June of 2018 to March of 2020 when she and 7,000+ volunteers were sent back to the United States in wake of the COVID-19 pandemic. Upon returning to the United States, Julie decided to pursue a Master of Professional Studies in International Agriculture and Rural Development at Cornell University.

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I would specifically like to thank Dr. Peter Hobbs, my academic advisor, for his incredible patience and support in helping me write this capstone paper. I'd also like to thank Dr. Rebecca Nelson for inspiring me with new perspective on what this capstone could be.

I would be remiss if I didn't acknowledge The Source of all that is good. Along with my Comorian friends, I say *Alhamdulillahi Rabbil Alamin*.

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# PREFACE

I admit to feeling uncomfortable writing this paper for several reasons. I'm uncomfortable writing about my Peace Corps experience because I'm uncomfortable with the Peace Corps. Ever since learning about the Peace Corps in junior high, I was drawn to the idea of Americans sowing peace rather than the violence of war throughout the world---drawn to the idea of somehow relieving suffering---drawn to the idea of learning about and experiencing life in a way that is different from my upbringing and learning a new language and way of thinking. I don't think any of these are bad impulses, but I recognize they are problematic.

While it's possible that the reasons behind establishing the Peace Corps were truly motivated by love of Peace and cross-cultural exchange, it is also possible that they were and are motivated by the self-interest of the American government- a way of getting people 'on our side'. That maybe an understandable motivation, and maybe not necessarily wrong, but portraying it as benevolent seems dishonest. The other problem I see is that, at least historically, the role Americans play in the system as helpers (we're sending the 'qualified' people), and the post countries as people who need help perpetuates the false idea that somehow white, affluent Americans know better how to solve the world's problems than other people. In my own Peace Corps experience, my trainers were Comorian- they taught me to teach English, but our country director (their boss) was American.

As far as relieving suffering goes, suffering is everywhere- people in my own family, neighborhood, community, city, state, and nation are suffering. I think it's human nature to look outward to try to solve problems because not being part of the problem makes it more obvious (the old mote and beam story). I think most Peace Corps volunteers would say that most (if not all) of the benefits of their Peace Corps service were accrued by them, rather than their

community. I know that in my case I was welcomed, housed, fed, befriended, and taught with endless patience and grace while I struggled to see how and what to offer to people who were so giving. Yet it is called volunteering and serving- setting me up as the person giving something.

Related to this problem is my perspective as the storyteller. This paper is only interesting (if it is at all) because it includes Comoros. It feels a bit like I'm using the rich gifts of experience that I was given in Comoros as currency to get a degree. Shouldn't the degree and the resources that it affords me be conferred on the people who so generously shared their knowledge and lives with me? I have not travelled to Comoros in the capacity of researcher, with IRB approval and participatory methods in tow, able to find and present the perspectives of Comorians on their own terms (if that is what would actually happen). I am only writing about my experiences from my perspective, certainly with an effort at representing places and people as accurately as possible, but is that enough?

Another source of discomfort stems from my stance on issues in development and agriculture. It is not an original stance, but it does go against the grain of some of the professors and institutions whom I honor for their intentions and rich knowledge but with whom I disagree on some points. The concepts of international development and agricultural extension, where wealthier people with a western education at worst exploit and/or dictate to people with less power what is best, or, in not as harsh a light, offer their 'superior' knowledge to those who are presumably not in the know, seems problematic. Many of my courses at Cornell have helped me explore these problems. I hope my analysis is taken as it is meant- a humble attempt at meaning-making based on my life experience and the knowledge I've gained through education, both formal and informal.

## Introduction

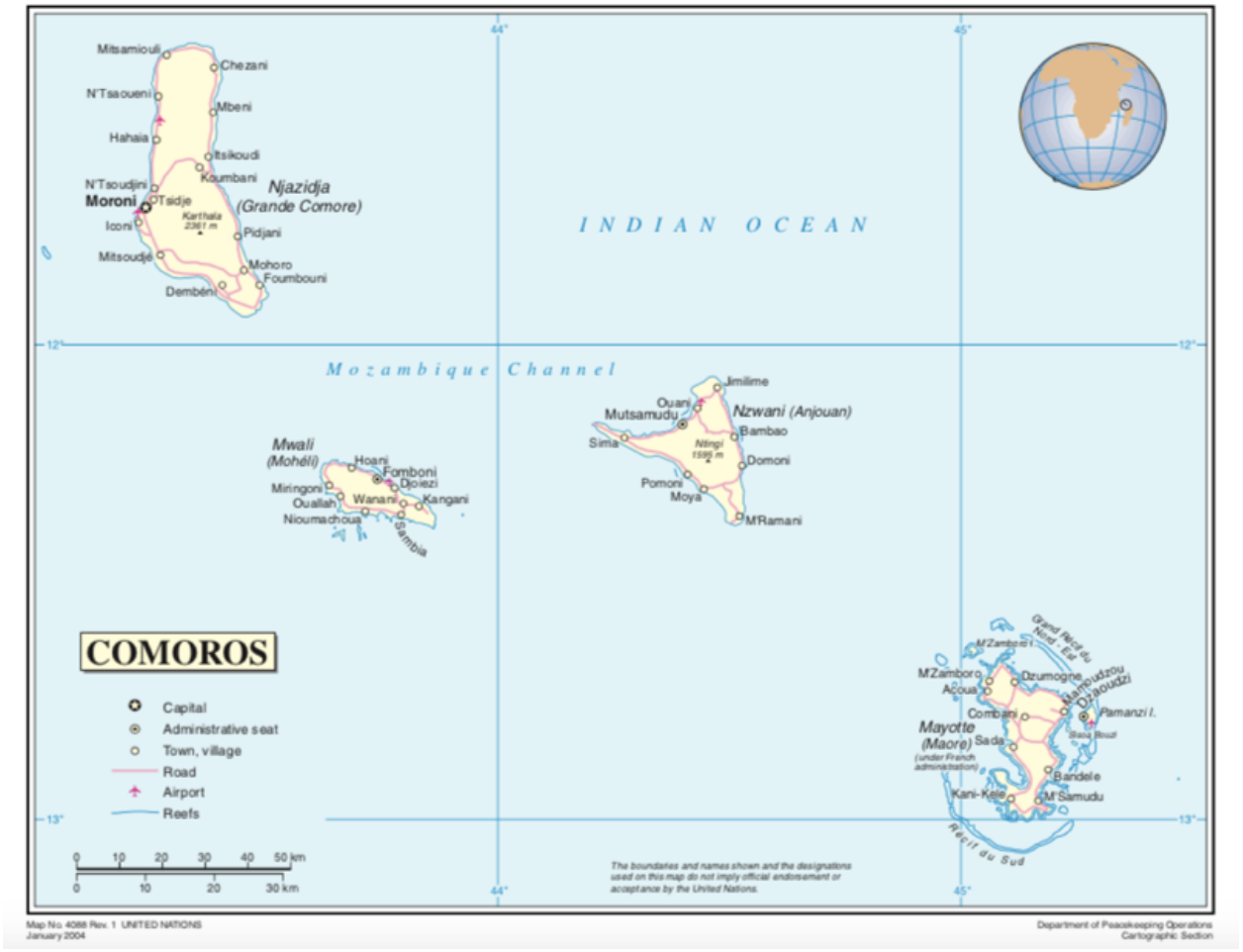


Figure 1: UN map created 2004, from (UNDAF, 2018)

BILA MIRI KAPVUNA MADJI

Without trees, there is no water

On the island of Mwali (Figure 1), there are many sayings that form a common consciousness. 'Bila miri kapvuna madji' (without trees, there is no water) is one of these proverbs. Mwali is the smallest of four islands in the Comoros Archipelago, which is situated in the Mozambique channel northwest of Madagascar (see figure 1). I lived there from August

2018-March 2020 as a Peace Corps Volunteer teaching English in the public middle school of my village. I arrived in Comoros in June of 2018, and trained for a few months on the big island, Ngazidja, in English teaching methods and all things Peace Corps (safety and health awareness, Participatory Analysis for Community Action, etc.). We also learned the local language. At first we learned Shingazidja-the dialect of Shikomori (a Bantu language related to Swahili) that is spoken on the big island. After a few weeks of training, we were assigned to our specific posts and islands. My wish came true and I was assigned to Mwali, so I started learning Shimwali. After a month or so of learning Shimwali, I traveled to Mwali from the big island for a short, preliminary stint at my post to meet my host family and be introduced to my community. As we drove from the airport into the capitol, I noticed a wall painted with street art. I was still a neophyte of Shimwali, but luckily the words on the wall were part of my baby vocabulary: Mwali ya pvodjana (Mwali of yesterday) and Mwali ya miheso (Mwali of tomorrow). Mwali of yesterday was a beautiful green island, covered in trees, villages, and flowing rivers. Mwali of tomorrow had no trees, and dry riverbeds.

Figure 2. Street art on the walls of Fomboni, the capital of Mwali (my own photos).

As I rode up the hill from the capital to the village where I would live, my breath was taken away by the beauty of the green wall of sun-dappled vegetation on either side of the road, punctuated by vistas of ocean.

Wanani, my village, sits at the highest elevation of any village on Mwali. The temperatures and humidity there are less extreme. Wanani and the region of which it is the center, Djando, are known for having an environment that is suitable for agriculture. When I first arrived in Wanani, I thought it was a little brownish-gray. Maybe it was just the immediate contrast with the green ride up the hill, or the green backdrop of the tree-covered extinct volcanic-built peaks. It's true that homes are mostly built out of gray cinderblocks, with some homes being constructed of a traditional mud-straw mixture built on a stone foundation with a wooden frame, and then whitewashed. There are (relatively) not many trees or other plants near the homes at the center of the village, or lining the smaller streets. My host family lived close to the center of the village on the side moving up the hill- toward the green of trees, the 'malavuni'. Malavuni is a word that can't translate directly to English. It basically means the area where people don't live, but in context could be translated as 'the bush', 'the forest', 'the food forest', 'the farming area', 'the wilderness'… I loved to climb the bamboo ladder to the flat roof of our house (perfect for drying cloves and laundry), and look up the hill to the Malavuni, or out past the village in any direction to eventually see trees.

Once I was at the home of my community counterpart (an English teacher), whose family were becoming a second host family to me. As is the custom in Comoros, my counterpart lived in his wife's house, in a compound with her family. His mother-in-law and wife became two of my closest friends, and we were celebrating because a brother was visiting from the neigboring island. This brother was newly married and an expectant father attending school in Ndzuani

(Anjouan in French)- the only island with an approach deep enough to serve as a port for large ocean-going vessels. Ndzuani is the most densely populated Comorian island, and arguably has the most poverty. We got to talking about the rivers that were disappearing in Anjouan because of trees being cut down (a story featuring this problem was published in 2018 by the United Nations Environment Programme). The trees were being removed for a lot of reasons, but a main driver was the fuel needed in the distilling process for Ylang Ylang (see box 1). Together we lamented this degradation of the human environment, and the loss of biodiversity and possibility that it represented. I can't remember clearly the words that were said, but I believe we comisserated on the sustainable nature of traditional Mwalian farming practices, which leave large trees intact.

It may have been on the very next day that I saw this brother and a faithful friend walking past my house toward the malavuni-- with chainsaw in tow. I asked in alarm what they were doing. He said he had to take out some big trees on his mom's plot of land so that he could plant Ylang Ylang trees. "What about the trees and the rivers?!" I asked. "I have no choice" was his reply.

Maybe he was right, maybe that was the only choice, given the circumstances, time and place- I'm not in the same situation, so I can't really judge (but I do love trees, and feel the loss whenever any tree is cut down). I'm opening my paper with this experience because it seems like an allegory for what has happened and is happening in our world on a global scale. There are children to feed, and it seems like we have to make environmental sacrifices, often against our will, in order to produce enough food for those children. Yet, those very sacrifices of the environment in the name of the children are taking away their future life support system. (*Bila miri, kapvuna madji!*)

This capstone paper is an effort at meaning-making of my experience as a Peace Corps volunteer in Comoros, and as a student in the Global Development program at Cornell. In the spirit of Paolo Friere's idea that "*Looking at the past must only be a means of understanding more clearly what and who they are so that they can more wisely build the future"* (2005, p. 84), I will reflect on my experiences--'looking at the past' as a sort of case study, and tie those experiences to concepts in the fields of development and agriculture, leading to a discussion of 'more wisely build[ing] the future'. The first section of the paper will deal with development: the UN's 17 Sustainable Development Goals (SDGs), the idea of 'structural transformation', my own definition of development, and how these relate to Comoros and the U.S. The second section will focus more specifically on Agriculture, with a look at available statistical information about agriculture in Comoros, and a detailed case study of Comorian agriculture through the window of Wanani. I will argue for the validity of the agroecological model of agriculture as a means of attaining development as a global community. The third section will ask *"what could have been?"* and *"what can yet be?"*-- questions I would have asked if I had been able to travel to Comoros as an MPS student, and also what the knowledge I am taking away means for the future. All along the way, there will be boxes featuring Comorian crops as the stars of this paper, since plants make everything possible.

Box 1: Ylang Ylang (*Cananga odorata*) Family Annonaceae

Ylang Ylang is a tree that can grow to 30 meters. It's native to Indonesia, but was brought by westerners to the Phillipines, then Réunion, but is not extensively grown in either of those locations any more. Comoros is the world's top supplier of Ylang Ylang essential oil, with Madagascar and Mayotte trailing behind. Ylang Ylang represented 20.2% of Comoros income in 2020 (BCC, 2020). Expensive perfumes, such as Chanel n°5, Bois des Iles, and Diorissimo contain Ylang. The flowers yield a relatively large portion of oil: only 45-50 kilos are needed to produce one kilo of oil, while 4000 kilos of roses are needed to produce one kilo of rose oil. The oil must be distilled from fully open flowers soon after they are picked, so the furnaces used to distill the oil are near the areas where Ylang Ylang is being grown. The distillation process can take as many as 24 hours, with different grades of oil resulting by stages throughout the process. On Ndzuani especially, this has meant the felling of large trees to use as fuel for the distillation of Ylang Ylang. This has lead to deforestation and land degradation. France is the main importer of the oil. Some of the french companies for whom the oil is produced are making attempts to mitigate the problem of deforestation by using more efficient stoves, and providing fast-growing seedlings for reforestation projects. Ylang Ylang plantings themselves can often be problematic. Comorian farmers told me that Ylang Ylang loves the sun, so unlike most crops on Comoros, it was grown without the shade of larger trees- people would generally clear-cut a steep hillside facing the sun to plant Ylang Ylang. The trees were pruned and trained so they would be the height of a person to facilitate harvest. Ylang Ylang can be harvested year round, which supplies a steadier source of income than cloves or vanilla, which are seasonal. When I would ride my bike down to the beach of Sambia, I would ride past several Ylang Ylang plantings- if the time of day and temperature was just right, the overwhleming fragrance transported me to a floral dream. (Biolandes, 2017).
Photo credit: BIOLANDES and Matthieu Sartre

**Section I: Development**

Sustainable development as defined on the FAQ section of the United Nations sustainable development page is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs", by harmonizing "economic growth, social inclusion and environmental protection". There are 17 SDGs (sustainable development goals)

outlined by the UN (see figure 3), which match the general themes of social welfare/inclusion, economic growth, and a sound environment. These goals are frequently cited and referred to by professors, students, and seminar lecturers.

The premier SDG is the elimination of poverty. Statistics on poverty typically rely on measures of income, for example, the $1.9 USD international poverty line adjusted for purchasing power. According to the World Bank, only 1% of the U.S. population (in 2018) was below that poverty line, while the measure for Comoros (in 2014) was 19.1%. Income inequality, measured by the Gini Coefficient (a scale of 0-1, with 0 meaning perfect equality, 1 meaning total inequality), is quite comparable for the two countries, with the U. S. in 2018 at 0.414, and Comoros in 2014 at 0.453. (World Bank, 2021). The most recent world bank report on poverty in Comoros expands on this data to say that both poverty and income inequality are greater in rural areas, most notably on Ndzuani (see figure 3).

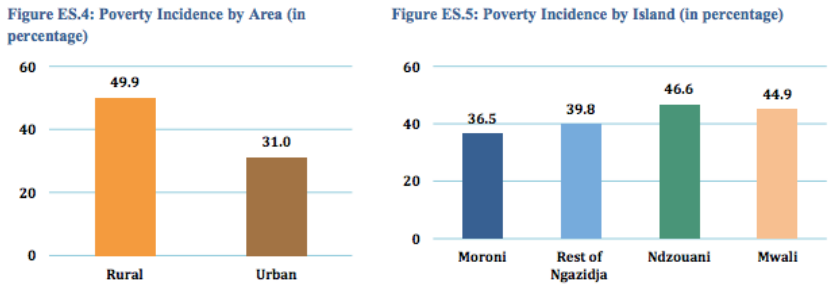



Figure 3. The top graph shows a breakdown of poverty rates, in a comparison of rural vs. urban, and then between islands and the country's capital (Moroni). The bottom graph does the same comparison, but of inequality by way of the Gini Coefficient.

These graphs in some ways resonate with my experience. I have never personally been to Ndzuani, but many (if not most) of the people in my village were either themselves born in Ndzuani or had parents born there. The grandmother of my host siblings one day said "Ndzuani nge fo"- Ndzuani is dying. A Peace Corps volunteer that I knew who lived in a poorer village on Ndzuani was worried about having enough water to drink (rivers drying), while other volunteers on Ndzuani lived in very fancy homes. Ndzuani also was a place where you could find more imported goods in the urban areas.

On the big island (Ngazidja), many people have family who send remittances. Remittances contribute more to the Comorian GDP than exports (World Bank, 2017). The village on Ngazidja where Peace Corps training took place is the site of the national university. It houses some important people in the government, and is a short taxi ride up the volcano from Moroni. Summer is a string of elaborate wedding parties when the 'je viens', Comorians from France, come back to Comoros for vacation, and for important events, like weddings which impart social status even in the Comorian diaspora (Walker, 2019), where cars or large household appliances may be gifted to the couple.

It's true that people in Wanani (my village in Mwali) didn't generally have cars or appliances (with some exceptions). However, fish, fresh fruit, cassava leaves (a staple) and other foraged or grown leafy greens, root crops, chili peppers (an every meal staple), all types of spices (turmeric, ginger, black pepper, cinnamon, cloves, etc), and pigeon peas or other beans/pulses with corn (in season) were widely grown and consumed, with everything except the fish being potentially produced by each family with no inputs but time, saved seed, and human energy. Products like rice, salt, tomato paste, fresh tomatoes, oil (though store-bought oil had only recently replaced home-produced coconut oil), chicken wings or meat (unless there was a

reason to slaughter an animal), garlic, shallots, and cumin had to be purchased. The environment in Mwali could be percieved as more pleasant to live in than that of Moroni, as there was more space and plants, and less pavement, visible garbage, and car skeletons. My next-door neighbor on Mwali was someone who had worked in Moroni, but when it came time to retire, he chose to live in Mwali. Another host dad of a Peace Corps friend had worked his whole adult life in France, but also came to Mwali to retire.

All of this to say that income, to me, is not necessarily the best measure of prosperity or quality of life, and measuring 'development' this way can lead to some erroneous conclusions and judgements. If we measure prosperity simply by income, then a family who has been uprooted from their social connections and lives in the city in tight, polluted quarters, but is able to find wage work to buy enough food to meet their caloric needs seems wealthier by this metric than a family living in a rural area who may have several plots of land (or share communal land) where they grow enough food to meet caloric needs (and more likely micronutrients) of their family, and enjoy fresh air, space, village connections, and (depending on the season) possibly more leisure time (though I suppose a person who didn't like farming, but liked whatever employment they had in the city would consider themself fortunate to be there).

I think it is actually a dangerous practice because it changes how people percieve 'development'. Living on less than two dollars a day sounds impossible to someone who grew up in a market-based economy far from where food is grown. When development experts or heads of state talk about strides that have been made toward reducing poverty in countries where widescale development projects have taken place, and how much better off people are in cities, it undermines the integrity of smallholder farmers and it might be a distortion of reality and the very meaning of development (see figure 4).

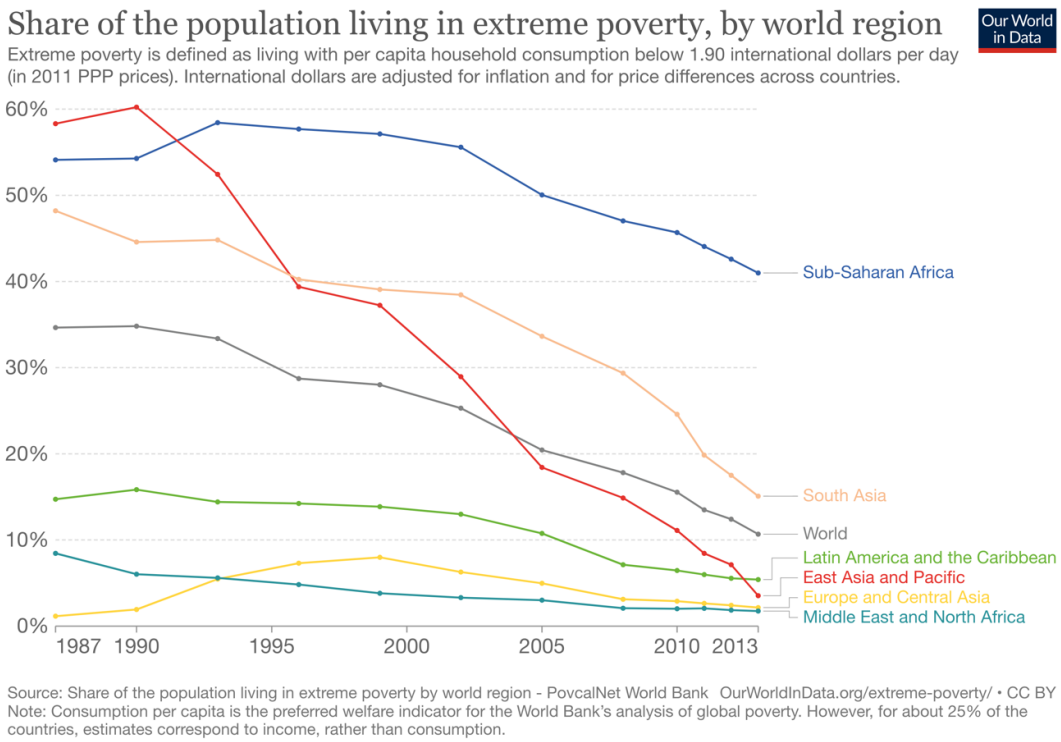



Figure 4. Graphs like this, based both on consumption and income data from the formal economy show progress being made toward reducing poverty, but do not reveal how life has changed for the poor in these areas. Notably, North America is missing from this chart (Global Change Data Lab, 2013).

Maggie Black (2015) claims that over the span of time since the development industry began (post world war 2), more people are living in poverty, and some of the poverty stems from projects touted as "development". For example, the case where smallholder farmers in Mozambique were pushed off the land they had traditionally farmed for cashews and other crops by an international company that wanted to grow sugarcane for biofuel and was supported by the government for the cause of 'development'. Black (2015) estimates that 15 million people a year are displaced by large scale 'development' projects such as dams, and land grabs by mining or agricultural companies. People displaced by these projects may be less fortnuate than refugees born of conflict who may one day return home. Ironically, governements in countries where such projects take place end up owing an international bank for the project, and companies from

wealthier nations get the contracts to build the infrastructure. Perkins (2004) claims this is an intentional process instigated by powerful governments and multinational companies. In a course I took at Cornell on Asian Development Bank projects, this scenario occurred over and over- electricity projects in Mongolia, dams on the great Mekong, which once provided millions of people with livelihoods and plentiful protein, but now gives them electricity. One of my co-workers at FedEx was a woman from Thailand who had recently migrated to the U.S. She talked about how she and her brother had given up farming and moved to the city because they couldn't earn enough money growing rice in their village. When I asked her if she would have rather stayed in her village or lived in the city she said "Our village, of course, but we had no choice".

The most heartbreaking illustration of development meaning destruction from my Asian Development Bank (ADB) class came as a representative from the ADB who specialized in gender equality (SDG 5 of 17) spoke to our class about a project in Vietnam. A road had been built (infrastructure, SDG 9) to a forest that was occupied by indigenous people. In that indigenous culture, men typically gathered from the forest, while women stayed at home, cared for the children, and grew food. Traditionally the men had more power and were the decision makers for households. The ADB thought women should have more power (not arguing with that), also the forest that people had been living on for centuries was now being overexploited, so the government needed to protect it (SDG 15-life on land). As a result, the men from this indigenous society were less and less able to feed their families from the forest. The ADB set out to empower women with employment projects. Now there are problems with women being overworked, not at home, men without occupation turning to alchoholism, and children resorting to videogames. Yet the project is seen as a success by ADB because women have more power.

At Cornell, I first learned about 'The Structural Transformation', a seemingly inevitable process where agriculture becomes a smaller share of the economy, but simultaneously more productive (more GDP gained from industry and other sectors, with larger and more mechanized farms requiring less human labor). C. Peter Timmer (2009) asserts that "…If history is any guide, no escape from hunger and poverty has been sustainable without a successful structural tranformation." Examining the history of how the structural transformation has taken place does not exactly reveal it as pro-poor. It seems that the structural transformation of Europe was facilitated by the institution of slavery and cheap wage labor from peasants who had been pushed out of the commons by the land-grabbing gentry (Montgomery, 2007).

The ideals of the UN's 17 SDGs are in most cases difficult to argue with: no hunger, equality, health, education, healthy environments, etc. Organizations like the UN have tried to get at a more nuanced vision of what 'deprivation' and 'development' mean. Their Human Development Index (HDI) is built around life expectancy and schooling data, in addition to income, and is now supplemented by data about inequality, gender, and multidimensional poverty (which adds sanitation, electricity, and water, etc.).

The way in which development banks, governments (poorer governments often working with wealthier governments or large companies from the outside), outsider non-governmental organizations (NGOs), western universities, and international organizations (like the UN) make attempts at alleviating poverty, and the very presumption that they are the ones to do so is questionable. Robert Chambers argues that the poor themselves should be idea generators and the decision-makers in their own 'development' process. In contrast to the western notions of development and poverty being tied to income, or GDP, participatory poverty assessments have seen issues as diverse as health, time to spend with neighbors in important life events, intact

families, access to mango trees, rude or polite behavior, quality of housing etc. ranked as important factors in well-being by poor people. (Chambers, 1995).

When I lived in Wanani, all of the roads except the two main roads that led out of town were unpaved. I didn't like getting muddy feet when it rained (which happened often), but my background of being from the desert and worrying about how pavement prevents infiltration of water back to the aquifer, knowing that paved roads often lead to exploitation, as with wilderness areas in the western U.S., and having an aesthetic that favors natural over man-made, I liked the red dirt roads of Wanani, mud and all. My neighbor (who had recently moved from Moroni and was wealthy enough to have a car) was always trying to convince me that I should somehow get the road we lived on paved. I told him I didn't have the power or resources to do that, and that I didn't like paved roads--where would the children constantly in our little street play? Well, after I left my village, many of my friends and family proudly and excitedly sent me videos of the roads of Wanani being paved. Women's organizations in the village had held fund-raising feast parties for the project. People were relieved to have smooth, non-muddy surfaces to walk on. Comorians keep their feet and shoes impeccably clean (when a fellow Peace Corps volunteer came to visit, my 5-year-old host brother noticed that his feet were dirty). Also, sand fleas are a painful pest that burrow into feet during the hot, dry, dusty season and paved roads might reduce their incidence. I, as an outsider, did not consider roads a priority, but the people in my village did, and they made it happen. (see figure 5)

Figure 5: A photo of a street in Wanani as it is being paved. This road frequently had deep flows of muddy water during heavy storms. Sent by T. Chaclati via whatsapp 25 Oct, 2020.

I support the idea of development as 'good change' (Chambers, 1995), which allows people to define what they would like to see, and applies to any society, not only those with lower monetary resources. The UNDP HDI (2020) evaluation for Comoros on education is 0.482 (the U.S. is 0.9). Many Comorians I spoke with wanted education in their village to change for the better. People would put a lot of their resources toward paying for private schools (and public schools as well). Many people in a village or family would contribute money to fund the education of a promising student in Madagascar, China, or Morocco. Many of the teachers who were my colleagues had benefitted from such educations. But there is the issue of what is available as education. In Comoros, and in many African countries, colonial languages are the language of education. In some countries (or maybe all, who am I to say?) this might make sense- my friends from Côte d'Ivoire said that they appreciated their schooling being in French because it gave all of the people in their country (where many languages are spoken by multiple

ethnic groups) a lingua franca and gave them opportunities to interact with other French-speakers in the global context.

In Comoros, people speak some version of Shikomori, and when children arrive at school many of them, especially those with parents who have less formal education, have very little exposure to French. Then, suddenly they are expected to learn how to read in French! How can you sound out a word and make meaning from it if you've never heard the word before, or don't know what it means? I was constantly amazed at the ability and perseverance of so many of my students who somehow managed to do exactly that. But the majority of my students were spending years in a schooling system where the lessons they were memorizing meant almost nothing to them. An organization on Mwali had started publishing little booklets in Shimwali- a couple of booklets of Shimwali proverbs, and a couple with traditional stories in Shimwali. I bought some in the capital and brought them home to show to my host family. My young host cousin- about 15 years old- who spoke very little French and self-reported as a horrible student, hating school, started slowly sounding out and reading the books--wouldn't stop, and asked to take one home (I never saw it again). To me a goal of education is not enough- the education should be one that is meaningful to the people who are being educated and has some bearing on their daily experience. Many of my students walked from villages on the beach up the hill to my school for well over an hour (one-way) every day. They were constantly bringing to mind a poem I'd had to memorize in junior high French class, Prière d'un petit enfant nègre (Prayer of a little black child) :

> Seigneur, je suis très fatigué
> Je suis né fatigué
> Et j'ai beaucoup marché depuis le chant du coq
> Et le morne est bien haut qui mène à leur école,
> Seigneur, je ne veux plus aller à leur école,
> Faites, je vous en prie, que je n'y aille plus…

Which essentially translates as: “Lord, I’m very tired, I was born tired, and I’ve walked so much since the rooster’s crow, and the hill is truly steep and high that leads to their school, Lord, I don’t want to go to their school anymore, please make it so I don’t have to go there anymore…”. The student goes on to assert that he doesn’t want to become one of the “proper city men”, but would rather follow his father through the fields, and listen to the elders tell stories (Tirolien, 1961). How many children worldwide, in every country, are being educated in a way that divorces them from their natural environment, community, and culture?

Adequate health care seems like one of the most urgent needs for most Comorians. Comorian life expectancy at birth is 64.3 years, with 31.1% of children under 5 stunted (measure of malnourishment), and 7.4 % of the GDP being spent on health care. In the U. S., life expectancy is 78.9 years, 3.5% of children under 5 are stunted, and 17.1% of GDP is spent on healthcare: a sizeable difference. Based on observation, this seemed like one of the biggest motivators for outmigration. My host family in Mvouni had a cousin who lived in Mayotte, the oldest island in the Archipelago, which decided to stay with France when Comoros gained independence in 1975. Her son lived with my host family, but she was diabetic and needed more medical care. There were relatives who went as far as France, Réunion, Madagascar, and Tanzania for medical care, if they had the money. My host dad in Mvouni was in the process of getting paper work to go to an Arabic speaking country (I can’t remember which) for medical care when he passed away. When children had dangerously high fevers, families rushed to get money together to pay for their stay in the hospital. When my host brother’s appendix burst on the big island, his family somehow gathered enough money for him to go to a private surgeon (a Comorian trained in France whom I came to know well when he treated an abscess on my ankle). Public health programs have done much to decrease the incidence of diseases like Malaria, but

being serously ill is a serious problem. However, overall, I would say that most Comorians are much more physically fit than than most Americans. How many people do you know who could climb a coconut tree? People generally also have wonderful teeth (there are almost no dentists). Children run around and engage in social play for many hours a day.

One measure on the UNDP HDI where the U.S. falls behind Comoros is in the area of security. In Comoros the number of homeless people due to natural disasters is 0/per year out of a million, and the number of people in prison per 100,000 is 27. In the US, those numbers are 51 homeless and 663/100,000 in prison. Often when I would discuss poverty with people in Comoros, we would touch on these subjects. People would say something like- "Your country is so rich". I would say "That's true, but there's more than one way of being rich". I would tell people that in the U.S., if you don't have actual money, you cannot buy food or afford housing, and that in spite of government programs to help people, there are many people who live on the street and don't have a home. That reality was literally incredible to many of my friends. Comoros is not immune to financial or natural disasters, but the homeless rate there is negligible. In my village, even people who were mentally ill and without family were taken care of with a home and food by other people in the village. Even in Moroni there are few, if any, homeless people.

In my view, one reason for this is the Comorian mindset on wealth. Once a stranger who was giving me a ride down the hill to Fomboni told me that anyone who was rich enough to run for office is already corrupt. At first I didn't understand this. Then the neighbors across the street, who were the biggest sellers of fish, tried raising their price from about $2/kilo to $3/kilo. There was outrage in the community, and many people refused to buy from them for a while. When I talked to the fish-selling neighbors about it, they said that fuel for their motorboats was

more expensive than it used to be, and they needed to maintain their equipment. That seemed a fair reason to me (fuel was constantly limited and taxi prices fluctuated frequently), but when I mentioned those reasons to a friend, she said that in Islam, people do not make exhorbitant profits at the expense of their neighbors. Fish was a necessity, and to make a large profit from increasing the price was morally wrong. My fish-selling neighbor's perspective was that people in their village never wanted anyone to raise themselves, but instead were always pulling them down.

His family also started running trade in foodstuffs to Ndzuani. Most Comorian oranges were very fragrant, but not extremely sweet and juicy. My fish-selling neighbors were working with people a village away who were somehow growing delicious oranges, to export them to Ndzuani. Bursting sacks of large, juicy deep-orange oranges were piling up in front of their house. I asked to buy some. They said they wouldn't sell me any, but they would give me some. They could get an outrageous (by the standards of Mwali) price for the oranges on Ndzuani (where there were some wealthy people and not as many crops for reasons already presented in this paper), so rather than sell to their neighbors at the Mwali prices, they were going outside. There was tension in the neighborhood, resulting in a blow-out between my host family and these neighbors, who had once been extremely close (my host sister lived in their house as a child for a while).

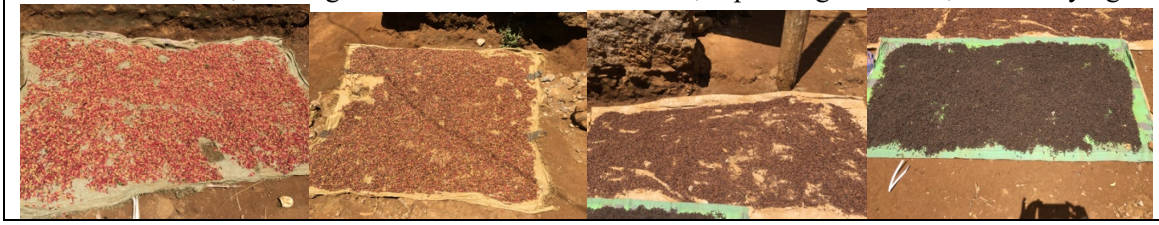
When people do earn a lot of money (for example during cloves season, see Box 2), the excess is distributed to family and friends in need (at least customarily). I once happened upon my friend, a history teacher in the same public school where I taught, as she and her husband were going through a very large stack of cash that came from the harvest of dried cloves they had sold. They were arguing about how much to give to each person in their sphere of influence with

need, with my friend saying that they needed to keep more of it to take care of themselves and her husband urging generosity. He told me to ask her where her heart was.

Box 2: Cloves/Nkarafu (*Syzigium aromaticum*) Family Myrtaceae

Cloves are the largest source of export income in Comoros; 40.5% in 2020 (BCC, 2020), and 57% in 2015. They are not widely harvested in Ngazidja currently (though there are some trees there that people may use at home), Ndzuani is the leader in production, with Mwali producing about 20% of total clove exports, which can range from 3,000-5,000 MT/year, compared to Madagascar (the leader), which exports 10,000-20,000 MT (World Bank Group, 2019) . It was clove season when I arrived in Wanani in September, and my street was lined with tarps of drying cloves (see my own photo to the right). The air on my street smelled like drying cloves, which is sweet and refreshing- reminding me of watery spiced pineapple. Nearly everyone participates in the clove harvest. Children, and nimble men and women harvest the cloves by climbing the trees or harvesting what they can reach from the ground if they are less nimble. Young men from Ndzuani travel to Mwali to earn money harvesting cloves for wealthier people. All people help remove the cloves from their stems. Children and others can bring their freshly harvested and de-stemmed cloves to a neighbor who is a collector for quick cash (about $1/kilo). Then the collector (or very motivated children) dry the cloves so that they can then sell them to a larger collector for about $5/kilo. This rate varies wildly from year to year, and is set on some level by the price that Madagascar is demanding in the market, but the government also sets what is meant to be a base price. The value chain is short, with harvester, collector, and exporter being the principal links, which means that growers get almost ¾ of the export price. A bad clove year meant a shortage of money to pay school fees for my students.

Cloves on the tree, walking home from the cloves harvest, separating the stems, cloves drying



The second half of the conversation I would have with people about "more than one way of being poor" dealt with personal security. I would tell them that, especially in large cities, robbery and violent crime is something you have to worry about. Even in my suburban neigbohood, we lock our home at night. Comorians would counter with- "That's true, you could stay out all night here anywhere, and no one would bother you". It is custom that when you approach a Comorian home, you call "Hodi!", they yell "Karibu!" (Welcome!, literally come closer). I've heard that on Mayotte now the response is "C'est qui?" (who is it?) rather than "Karibu!".

The saying that 'It takes a village to raise a child' is not lip service in Comoros. People treat any child in the village as their own-- this includes feeding and punishing without any persmission or knowledge of the biological parents. There is an incredible amount of trust in that social contract. Statistics on poverty often ignore the strength and security that is inherent in community connections. As Albert Einstein wrote, "Not everything that can be counted counts, and not everything that counts can be counted." (from Chambers, 1995).

**Section II: Agriculture**

**Characterization of the Comorian agricultural environment:**

Comoros is part of the Madagascar biodiversity hotspot, rich in endemic species and biological diversity (Convention on Biological Diversity, n.d.). According to FAOSTAT, close to 70% of Comorian land is dedicated to agriculture, and about 20% is forested. The population of Comoros has increased from approximately 500,000 in 1997 to over 800,000 in 2017. The ratio of rural to urban population over that time period has remained fairly constant with just over 70% rural and just under 30% urban. Over 57% of Comorians are employed in agriculture. Women, when considered separately, have a 63% rate of employment in agriculture.

According to the the Köppen-Trewartha climate classification system, Comoros is in the Tropical Humid Climate group **A/Ar,** because a killing frost is absent, the mean monthly temperature for all months is above 18° C (64°F), and it has fewer than 2 (dry) months with an average rainfall of 6 cm or less. The maximum temperature for a typical warmest month in Comoros would be around 30.8°C (87.4°F), with 27.7°C (81.9°F) being the high during the coolest month. Temperatures can get down to 18.4°C during the coldest month. Total annual precipitation is around 270 cm, with 35% of that falling during the wettest 3-month period. Crops are variously grown during the wet and dry season. (See figures 6 and 7)

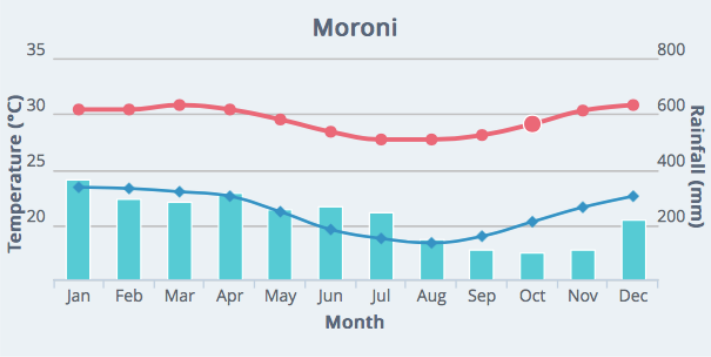



Figure 6: The wet season is at its peak between December and April- many fruits are in season at this time, notably mangoes and jackfruits. (World Meteorological Organization, 2021)

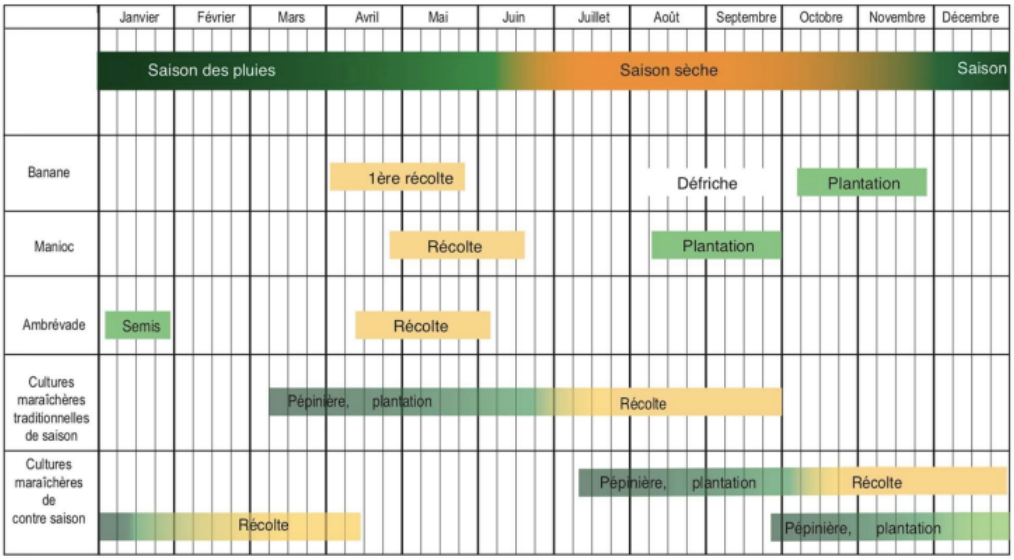



Figure 7: This chart shows the planting and harvest season for various crops. Ambrévades, or pigeon peas are sown simultaneously with corn and other beans and pulses. (World Bank Group, 2019)

In 2019, staff from the International Bank for Reconstruction and Development arm of The World Bank conducted an agricultural sector review of the Comoros, where they compiled and synthesized much of the available data about Comorian agriculture. They noted that because the Comoros are volcanic islands in a tropical climate, their soils vary depending on the age of the island. Ngazidja is the youngest island, with deeper, coarser, and less fertile ferralsols. There aren't any permanent rivers or groundwater sources on Ngazidja, so any agricultural water must have its origin in rain. The soils on Ndzuani and Mwali (older islands) are finer, have more organic matter and are thus more amenable to cultivation. All three islands have steep slopes and are subject to erosion. Surface and groundwater are available on Mwali and Ndzuani, but rivers are drying as trees are removed. (World Bank Group, 2019).

The only official agricultural survey that has been carried out in the Comoros was in 2004. Most of the holdings are in Ndzuani (Anjouan), with Ngazidja (Grande Comore) close behind, and Mwali (Mohéli) trailing far behind. These data are most likely relatively stable (World Bank Group, 2019). For more details on land holdings, (see figure 8).

| Metric | Value, 2004 |
|---|---|
| Number of Parcels | 95,695 |
| Number of Holdings | 52,464 |
| Farm employment | 78,995 |
| Share of holdings in Grande Comore, % | 43.8 |
| Share of holdings in Anjouan, % | 52.4 |
| Share of holdings in Moheli, % | 3.8 |
| Share of holdings operated by women, % | 32.6 |
| Share of holdings operated by cooperatives, % | 1.4 |
| Share of holdings with more than 3 crops | 16.4 |
| Share of holdings visited by extension last year, % | 8.2 |

Source: INSEED, FAO

Figure 8: Table from the World Bank Group report 2019, based on 2004 government survey.

Traditionally, most crops have been grown in the fertile lowlands, with livestock being reared in upland areas, but due to population pressures, more crops are being grown at higher elevations. Coconuts and cash crops are typically grown in lowlands, with traditional agroforestry that integrates many species, with fewer pest problems, in higher elevations. There is little mechanization in Comoros, with hoes and machetes being the main implements. Outside inputs, such as seed, insecticides, and purchased seed are rare. (World Bank Group, 2019). The only pesticide I observed being used was snail poison-- pellets which are sold at the market in Fomboni and used around horticultural crops like beans and chilies. Both my host family in Ngazidja and my friend in Mwali reported being given some sort of pesticide to use on tomatoes, but most Comorians are proud of the fact that they grow their food naturally, without a lot of chemicals (like the U.S.).

The World Bank Group identifies four major axes of Comorian agriculture: cash crops, subsistence food crops, animal husbandry, and fisheries. There are three major cash crops in Comoros: Ylang Ylang, Cloves, and Vanilla. Some data for Ylang Ylang and cloves have already been provided here in boxes 1 and 2. See box 3 for information about Vanilla. Cash crops make up 80% of export revenue for Comoros (Banque Centrale des Comores, 2020). Even with these exports, Comoros has a large trade deficit. Seventy percent of the Comorian food requirement is imported, including rice (the most important diet staple, consumed every day), along with chicken wings (cast-off from European and South American markets in favor of lighter meat), and Beef (mostly from India) (World Bank Group, 2019). Tomato paste is another imported processed food that is used almost daily. See figure 10 and 11 for data on import/export balance, as well as crop production.

Table 2-1: Top 5 Agricultural Import Commodities, 2015

| Commodity | Value, million US$ | Share of Imports, % | Origin |
|---|---|---|---|
| Prepared Vegetables | 86.9 | 24 | Tanzania |
| Rice | 13.2 | 3.6 | Pakistan |
| Fruit Juice | 12.4 | 3.4 | Tanzania |
| Chicken Meat | 10.6 | 2.9 | Argentina |
| Bovine meat | 6.4 | 1.9 | India |
| Agricultural Imports | 162 | 44.3 | |

Table 2-2: Top 3 Agricultural Export Commodities, 2015

| Commodity | Value, million US$ | Share of Exports, % | Destination |
|---|---|---|---|
| Cloves | 22.2 | 57 | India |
| Ylang-Ylang | 6.6 | 17 | France |
| Vanilla | 6.3 | 16 | Germany |
| Agricultural Imports | 35.1 | 90 | |

Source: MIT Observatory of Economic Complexity

Figure 9: Table from World Bank Group 2019. Note that the value of food imports (which make up most of the consumption budget) is almost five times as high as cash crop exports.

Table 5-3: Crop Production – A Snapshot from Most Recent Data Sources

| Crop | FAOSTAT Area Harvested, 2016 (1000 ha) | FAOSTAT Yield, 2016 (MT/ha) | FAOSTAT Output, 2016 (1000 MT) | BCC Output, (1000 MT) |
|---|---|---|---|---|
| **Oilcrops** | **35** | **3.4** | | |
| Coconut | 33.9 | 3.0 | 101.1 | 40.9[b] |
| Groundnuts | 1.1 | 0.8 | 1.0 | 3.0[a] |
| **Cereals** | **26.9** | **1.5** | | |
| Paddy Rice | 23.8 | 1.3 | 30.3 | 0.5[a] |
| Maize | 3.1 | 2.1 | 6.5 | 12.5[a] |
| **Pulses** | **17.4** | **8.6** | | |
| Pigeon Pea | 0.5 | 0.8 | 0.4 | 13.2 |
| **Roots and Tubers** | **16.5** | **5.8** | | |
| Cassava | 11.1 | 6.2 | 68.7 | 48.4[a] |
| Sweet Potatoes | 3.1 | 2.4 | 7.4 | 18.8[a] |
| Taro | 1.5 | 7.3 | 10.8 | 22.1 |
| **Fruits, fresh** | **9.0** | 4.8 | | |
| Bananas | 7.8 | 5.7 | 44.6 | 53.7[a] |
| **Cash Crops** | | | | |
| Cloves | 9.4 | 0.3 | 2.7 | 3.0[a] |
| Coffee | 1.0 | 0.1 | 0.1 | |
| Vanilla | 0.1 | 0.2 | 0.02 | 0.04[a] |
| **Vegetables** | **0.8** | **6.3** | **5.0** | |
| Tomatoes | 0.07 | 9.1 | 0.7 | 7.1[a] |
| Onions | 0.09 | 2.5 | 0.2 | 1.1[a] |

Sources: FAOSTAT. [a]Banque Central des Comores (2011), [b]Banque Central des Comores (2007). Highlighted cells show a discrepancy of more than 100 percent.

Figure 10: Data on agricultural production from FAOSTAT and the Banque Centrale des Comores. FAO tends to overestimate coconut and rice production compared to root crops. Data from the Comorian Central Bank emphasizes root crop production, and is likely more accurate (World Bank Group, 2019).

Box 3 Vanilla/Lavani (*Vanilla planifolia*) Family Orchidaceae

Vanilla is the world's most valuable spice next to saffron, and is extracted from the fruit of an orchid flower native to Mesoamerica. There are several species of Vanilla, but *Vanilla planifolia* is the most widely cultivated. Vanilla is typically propagated from cuttings as seed germination is complex and rates are low. Vanilla is only naturally pollinated by bees from its native range, so any vanilla flowers grown elsewhere must be pollinated by hand. Once pollinated, the seed pod (technically a capsule) takes 8-9 months to mature. They are harvested while green to prevent dehiscing, which makes them unusable. Vanilla is a semi-epiphytic vine (can root in soil or on plants) and can reach up to 60 meters in length. Madagascar is the leading producer, with Comoros being one of several secondary producers. (Chambers et al., 2019). In Wanani, more men were vanilla producers. They'd typically plant vanilla in holdings farther from the village and leave after sunrise prayer to tend to their vanilla crop when it was time for fertilization.

Picking and curing were done somewhat secretively due to the high value of the beans and potential for theft. Farmers have traditionally gotten fewer of the total profits from Vanilla, but there is a potential for farmers to have more autonomy and fewer links in the supply chain. A new UNDP program on Ngazidja has established a coop that includes both male and female farmers (UNDP, 2017). Photos are from my own collection. The upper photos are vanilla vines in my host dad's plot, and the bottom left photo is a bundle of vanilla vines he had taken from one field to transplant to another.

In sum, the World Bank surmises that poor agricultural production in Comoros is tied to use of poor varieties and some outdated techniques, as well as a lack of extension, processing, and marketing that could incentivize investment in the agricultural sector. Cassava, for example, is a major source of calories in Comoros, but currently low-yield varieties are commonly used. Introducing high-yielding, and biofortified varieties of Cassava in Comoros could increase food security and nutrition in Comoros, where currently 3 in10 children have stunted growth. Maize, taro, sweet potatoes, tomatoes, lettuce, and other greens, are widely consumed and commonly

grown in Comoros, but improved varieties, and also techniques that incorporate more organic input, conserve soil on slopes and increase possibilities for irrigation of the horticultural crops could lead to gains and decrease importation of the horticultural crops. Coconut is an example of a crop that could be used to much more advantage by Comorians. In the past, copra was used to make soaps in Comoros, which was then exported but this stopped in the 1980's, and cultivation of coconuts has decreased--with new plantings, and disease/pest control operations being nearly invisible. If this value chain could be revived, Comoros could make its own soap, as well as exporting it to other countries, thus providing income and employment and decreasing the likelihood of expansion of agriculture into the highlands, where much of the remaining intact natural habitats exist. Cloves, Vanilla, and Ylang Ylang are widely grown as cash crops in Comoros, but the lack of processing facilities and standards, as well as cooperatives that impart trading power make these commodities much less profitable than they could otherwise be.

The fishing sector is a key in the Comorian diet and economy. In 2009, fisheries accounted for 10-12 percent of the GDP, and employed 13.5 percent of laborers. Fish provided almost half of total animal protein intake. Traditional dugout canoes account for the majority of fishing vessels. These stay on the continental shelf and are able to access fewer fish. Motorized boats account for about 1/3 of the fleet and are able to go offshore. Comoros catches fewer fish than it could sustainably, but does not have any storage or processing facilities, and fish imports are actually increasing. The EU formerly had an agreement with Comoros for large offshore fishing vessels, which provided income to Comoros, but in 2018, the EU cancelled the contract citing irregularities in contracting with the government and fishing by the Comorian fleet. (World Bank Group, 2019)

Animal production in Comoros consists of Cows, small ruminants such as sheep and goats, and poultry (mainly chickens). Cows are mostly raised for milk production, particularly in the Niumakele region of Ndzuani. There aren't any facilities for processing dairy products, so milk must be sold either fresh or in a curdled state (known as dziya yi lala—sleeping milk). Milk prices are high. In 2017 they were just over $1/liter on Ndzuani, and $2.50/liter on Ngazidja. (World Bank Group, 2019). In Wanani, milk was typically $2.50/liter as well-approximately the same price as a kilo of fish. Powdered milk, though still expensive, was much cheaper (less than $1/liter). See figure 11 for animal and farmer numbers on each island. Some cows and most smaller ruminants are used as sources of meat for big occasions, like a religious event or wedding. They are typically tied up on a family's plot of land relatively close to the village. Some are found far afield, and there are often conflicts when cows or goats escape onto other people's land and damage their crops. The police station in Wanani usually had a few animals in the yard that were being held until the owner of the errant cow came to pay a fine.

| | Grande Comore | Anjouan | Mohéli | **National** |
|---|---|---|---|---|
| Number of dairy farmers | 100 | 4,000 | 40 | 4,140 |
| Number of dairy cows | 350 | 9,000 | 100 | 9,450 |
| Average size of farms (animals/unit) | 3.5 | 2.3 | 2.5 | 2.3 |
| Production per cow per year | 1,500 | 3,000 | 2,000 | |
| % of lactating animals | 70% | 90% | 90% | |
| Total production | 367,500 | 24,300,000 | 180,000 | 24,847,500 |

Source: Interviews with Private Veterinarians (December 2017)

Figure 11: World Bank Group data gathered in 2017, reported in 2019.

Almost every Comorian owns backyard chickens, but they typically don't provide a sufficient number of eggs and are rarely slaughtered for meat. Intensive poultry operations are becoming more common in Comoros. The poultry sector in Ngazidja is getting close to meeting local demand for eggs and competing with the cheaper price point of imported eggs from India, which have travelled over three weeks. There are small (<100 birds), medium (100<1000 birds),

and large (>1000 birds) operations on Ngazidja, with a significant number of facilities large enough to employ multiple people near Moroni. Ndzuani has more small and medium scale operations which are typically run at home by women. Mwali only has a few intensive poultry operations. There is opportunity for poultry farmers to make a living on par with a civil servant. Raising chickens for meat is currently not very feasible, due to the cheap price of imported chicken wings ('mabawa' in Shikomori- a favorite of children). Imported chicken is 50-100 percent cheaper than locally produced chicken. Comoros has an unusually high (for comparable African countries) consumption of 14 kg per capita of chicken wings, and only 1 percent of that chicken is sourced domestically. (World Bank Group, 2019)

These statistics and figures don't really give a full idea of Comorian agriculture. In order to convey a clearer picture of how food and cash crops are grown in Comoros, I'm including a case study mostly of my host mom's agricultural enterprises, but with some supplemental detail from other farmers I know to paint a broader stroke. It will not be completely representative but will provide a sketch of how agriculture takes place in Djando (our region), if not on Mwali (see figure 12, 13, and 14).

**Case study of Agriculture in Wanani, Mwali**

Figure 12: Google Maps (n.d.) image of Mwali, with Djando roughly outlined in red.

Figure 13: Google Maps (n.d.) of Wanani. The red circle is the approximate location of Gulanyundi, the red arrow points toward Wangani, green circle approximates Kokoriko and blue Halludja

Figure 14: Google Maps (n.d.) An even closer view of Wanani. The star marks my house, circle indicates Shitswankawe.

Case Study: Agriculture in Wanani

As a Peace Corps volunteer, I lived on the smallest Comorian island: Mwali (Mohéli in French). Mwali has a smaller population, and arguably less political power than the other two

islands. Mwali has a somewhat elongated ovate shape lying horizontally, with the wider end oriented NW, and the narrower end SE. The capitol, Fomboni, is on the northern approximate center of the island, and is on the coast. There is a ring road that runs westward along the coast of the island from Fomboni to the other largest village, Nioumachoua, which is on the southern approximate center of the coast. Nioumachoua is directly south of Fomboni as the crow flies, but the island has a mountainous backbone running the length of it, which makes it difficult to traverse. The road between Fomboni and Nioumachoua is passable, with some rough spots, and a large section was being repaired by a foreign construction company in 2018. Nioumachoua is the site of a hotel owned by Europeans, but which is staffed and run for the most part by Comorians. It is one of the only places on the island and in Comoros that is attractive to tourists. There is a beautiful coral reef near Nioumachoua and several small islets that are interesting to visit both above and below the water. Scuba divers from around the world (who are willing to go off the beaten path) come in hopes of seeing sea turtles, dugongs, giant lobsters, and many other coral reef species of the Indian Ocean.

After Nioumachoua, heading eastward, the road continues along the southern coast, but becomes less and less passable until it reaches a beach called Sambia. There is no village here, but it's a common point of departure for fishermen, and many people from the eastern part of the island (mainly Wanani) own plots of land in the area, which they cultivate. At this point, rather than run along the coast, the road veers inland to the north, rising in elevation until it reaches Wanani, the village that is situated at the highest populated point on the island. This is the village where I lived and taught English to middle school students. From Wanani, there is a crossroads, with one road heading eastward down the gradient, which eventually splits- each branch reaches a different coastal village: Hamavouna and Itsamia. Itsamia is sometimes visited by tourists

because it is a permanent nesting site for sea turtles. There is no hotel in Itsamia, but there is an information center about the turtles, some tourist bungalows run by the village, and tours, also offered by the village, which regulate tourist access to the beach and turtles. It is also the place where sweet and juicy oranges are grown.

Besides this eastward road which dead ends at the two coastal villages, the road which came from Nioumachoua continues to run northwestwards down the hill until it eventually reaches the north coast, down to Fomboni, making a complete circle of the island. The road from Wanani to Fomboni is in much better repair and is at a much shorter distance than the road from Fomboni to Nioumachoua. This makes it relatively easy for people to travel to the capitol from Wanani and other parts of this region of the island (called Djando), which is known for being the most productive agriculturally.

Although I was in Wanani as an English teacher, like most people from the area, my main interest was agriculture. My host family was large and complex, stretching across neighborhoods and even villages (one brother had married outside the village). I lived with the matriarch of the family and three of her grandchildren. Her name was Mma Loza. It is a Comorian naming custom that adults who have children are called by the name of their first child, or sometimes of another child for various reasons. Mma Loza was fairly prosperous, her son Loza owning the largest shop in town. She and others from my host family had several plots of land they cultivated in various manners. To give insight into the general farming practices of the island, I will describe the plots of land of my host family and some other acquaintances, which I believe are pretty typical (though on the wealthier side of the spectrum). Poorer people may have fewer plots, or they may farm a collective area that the village has set up for those who don't have land- this land was in a fertile, flat area between Wanani and Sambia.

Mma Loza had at least 5 plots of land that she cultivated. The first plot, called *Shitswankawe*, was just up the street from our house, within the village (there were some houses, and some other cultivated plots surrounding it). Shitswankawe was small- perhaps ¼ acre. It will eventually be the building site for a granddaughter's house (her daughter's oldest daughter). In this plot, Mma Loza planted several banana trees (*marinidi*), along with cassava (*mhogo*), corn (*buru*), pigeon peas (*ntsuzi*), sweet potatoes (*batata*), a papaya tree (*mpwapwari*), an *Averrhoa bilimbi* tree (cucumber or sorrel tree *(muhadju)* —it has fruit like sour cucumbers and is native to Indonesia) with passion fruit vines climbing it, and chili peppers.

The plot that was next-closest to the village was on a steep hillside above the main road. This plot was called *Kokoriko* and had several large clove (*mkarafu*) trees, some coconut trees (*minadzi*), at least one large mango tree (mmanga), possibly some leguminous trees, smaller guava (*mpwera*) trees, some cinnamon (*mdarasin*) trees (those had mostly been cut down to make way for the cloves, but there were always lots of cinnamon seedlings producing green leaves for herbal tea, or the old cut down trees providing firewood with an amazing aroma). Between the tree spaces on one hillside, Mma Loza had planted ylang ylang trees that were still young. She also tried planting corn, cassava, and pigeon peas in the gaps, but they did not take very well during the season I was there. Within this plot, Mma Loza also semi-cultivated a plant called *ndridi* (Polynesian arrowroot, *Tacca leontopetaloides*), which is an herbaceous perennial that resembles a fritillaria and produces a tuberous root that is harvested on a yearly basis (It regenerates by pieces of tuber that are left in the ground). Ndridi is harvested and painstakingly processed (see figures 15 and 16) for its starch, which can fetch as much as $10 per kilo (five times as much as fresh tuna!) when it is needed for making special party food- mainly pastries and desserts.

Figure 15: Ndridi in the field. The left photo is the flowering stalk, not yet open. The photo on the right is of two freshly dug tubers, which are located by looking for the brown, dry leaves of the plant (it's harvested when dormant). As I was digging for these tubers on two or three separate occasions, what looked like a small, black snake emerged from the earth and quickly serpentined away. Through internet research, I have found a possible identification: *Ramphotphlops braminus*, a burrowing snake commonly known as a brahminy blind snake which is native to Southeast Asia (Hawlitscheck, 2011).


Figure 16: Processing ndridi. On the left- ndridi is peeled, washed, then scraped on either coral or rough volacanic rock to make a paste. The paste is then washed and left to settle over several days to leach out the bitter taste and purify the starch which is eventually the consistency of corn starch once dried.

Another plot that was still within the village, but in a distant neighborhood called *Halludja* was larger-- maybe 1 acre. The principal crop grown here was coffee (mcafé) but growing along with the coffee was an avocado tree (*mzavoca*), a few citrus (mlimon) trees, a few coconut trees, a few clove trees, and some cassava. The coffee grown here (and a in other plots) was a cash crop. I never saw anyone on Mwali drink coffee, but it is consumed on the occasion of a funeral by men after prayer, so it is purchased for those occasions. Mma Loza and an older woman across the street who also grew coffee, dried the beans then pounded them to remove the husks. We never harvested the avocados from Halludja (I think they were harvested quickly by the people living nearby). Avocados are an important addition to the diet in their season. The main street of Wanani was lined with avocado trees until Hurricane Kenneth hit in 2019. They were not toppled by the storm, but rather cut down for fear that they would fall on people or structures in the event of another storm. When avocados are in season they are cut-up and mixed with lime juice and sugar as a dessert, sometimes with pieces of melon which is in season at the same time of year.

The fourth plot of land was about ½ hour walk from the village. There weren't any homes near this land. This plot was called *Gulanyundi*. Gulanyundi was probably about 2-3 acres in size and was mainly used for growing clove trees- I think there had been a lot of vanilla (*lavani*) growing there at one point, but cloves were becoming a more important crop. Most of the trees were younger than those in Kokoriko. I spent some good workdays in Gulanyundi with Mma Loza and her granddaughters. Mma Loza planted some baby clove trees, which she protected from the sun with large leaves. We spent time cutting back plants around the young clove trees. Along with cloves grew many coconut trees, a big mango tree, some coffee trees, a lemon (*mvrauba*) tree (I found out later it was technically out of the bounds of Mma Loza's

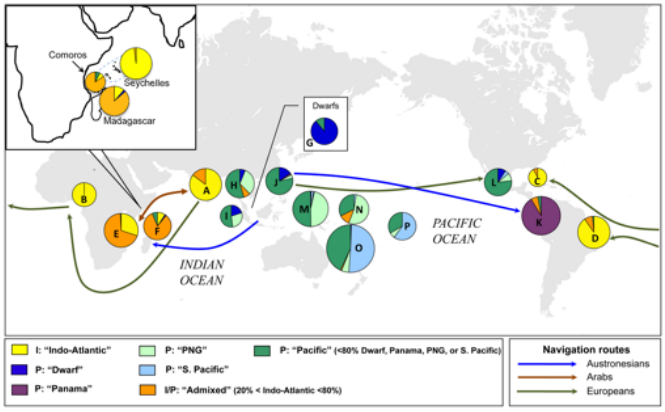
land), some larger non-fruiting trees, a kapok (*mpambafuma*) tree on the edge, a couple of orange trees (*mtrunda*), some tall grass (*ndapvu*) (cut and carried for a cow), and many chili (*putu*) plants- there was a hillside and valley with about 10 chili plants that were thriving. Mma Loza, her granddaughters and I planted about 15 more chili plants here, but only a few survived to bear fruit. Another thing I learned to collect in Gulanyundi was broom-making material. Mma Loza showed me how to choose a large coconut palm frond that had fallen to the ground and partially dried out so that it was brown, but not extremely brittle. We then used a machete to cut off the leaflets of the fronds (we each used one). We took the leaflets home, then in the evening when there was extra time, we used a knife to scrape off the leaf blades, leaving only the rachis of the leaflet. Once a bundle about 3-4 inches in diameter was made, they'd be tied together—that makes a very effective broom for sweeping multiple surfaces (packed dirt as well as cement).

The fifth plot of land, called Wangani was an hour long walk from the village in the opposite direction from Gulanyundi. It was up the hill, towards the beach of Sambia. Wangani was at a higher elevation than any of the other plots. It was a large plot of several acres. Here there was a breadfruit (*mfruiyapa*), Jackfruit (*mfenesi*), and mango tree. Many banana trees, many non-fruit-bearing trees, passionfruit vines (*girnadi*), coffee trees, clove trees, vanilla (a couple of trees were partially cleared and 15-20 vanilla plants installed towards the end of my stay), a key lime and a mandarin tree, several wonderfully fruitful chili plants of various types, cassava, taro (*madjimbi*), turmeric (*dzindzno*), and many coconut trees (see box 4). In addition to all the plants I'm naming, there were many plants in all of Mma Loza's holdings that were not grown for food. Some of them seemed weedy--there was a vine trying to climb the cassava stems that had to be cut back—but many were just part of the ensemble of plants that made up this food forest.

Box 4: Coconut/*Nadzi* (*Cocos nucifera*)

In a Shimwalian folk tale "Simba na Tsungura" (Lion and Rabbit), all of the animals gather to try and figure out how to get a steady supply of water. One of the animals suggests using green coconuts (*shidjavu*) , which the other animals think is not a bad idea…there just aren't enough. As a Peace Corps volunteer in the Comoros, I had a plan of compiling at least 100 uses for coconut that I observed. Grated coconut, turned into coconut milk is the backbone of comorian dishes- coconut rice, mataba (pounded cassava leaves seasoned and stewed in coconut milk—what I would call the national dish), pumpkin, mustard or taro greens, pigeon peas and other beans, fish, chicken, can all be stewed in coconut milk. Several breads and pastries integral to festivals rely on either coconut milk or grated coconut as an ingredient. Different parts of the coconut tree are used to build fires that are good for different purposes- the husks burn low and slow like charcaol, whereas the half-shells burn quick and hot, a great way to get a fire going. The dried leaf rachises, spathes, and inflorescenses are all used in the big, hot fires necessary to cook forty kilos of rice for a feast, or to fry a hundered bananas. Coconut oil is easily produced and though it's no longer generally used for cooking in Comoros (easier to buy soybean oil), it is used medicinally on wounds and skin irritations, etc. Coconut wood is a useful building material, it's cut into 4 x 4 beams and used as scaffolding for some strucures. The round parts that were removed to make the beams can form bench tops (see picture at the top, right). Coconut leaves are useful in making roofing material, or can be woven together to make walls (see top right). Coconut leaves can be used to make brooms or baskets.

Comorian coconuts are themselves great story tellers, it turns out. For a long time, experts have debated the origins and spread of coconuts and the people who cultivated them. In recent research, the evidence points to two sources of coconut origins: one in southeast asia, and one in the Indian subcontinent. Tracing genetic patterns from there, the southeast asian coconuts appear to have travelled with seafaring Austronesian people (from southeast asia) to the pacific. Today, coconuts from the pacific show the most evidence of breeding pressure- they are much shorter, and bear a meatier and waterier fruit. Interestingly, coconuts in Comoros and Madagascar are unique in the genitic mixture of both the Austronesian and Indian coconuts, indicating early human coconut husbandry in that region. (Gunn et al., 2011)




Recent genetic evidence from archaeological digs indicate that Comoros may have been the first site of settlement by Austronesian voyagers in the Southwest Indian Ocean. (Crowther et al., 2016)

Map credit: Gunn et al., 2011

Wangani had a slightly different climate from the other plots, and cassava leaves were plentiful there when they were scarce in other places. We harvested the most plentifully from

Wangani, which had the most biodiversity. Enough taro was harvested in a morning to have plenty for a week or two (for our household and several other family households) and to sell the excess for profit. My host dad (who was technically Mma Loza's son, Loza) came with us to this plot to harvest a bumper crop of turmeric that I wasn't even aware of until he started digging it out of the ground. This was also used for at least several weeks, distributed to family, and the excess sold. The same thing happened with chili peppers. We would collect as many as were ripe and easy to harvest whenever we were at the plot, then use what we could and sell the rest. Coconuts were the same, but they stay good in the field or at home for a long time after they fall out of the tree. There isn't reliable refrigeration, so most food does need to be consumed within a fairly narrow timeframe of harvest. This difficulty of times of plenty/times of scarcity is overcome by the communal nature of the family and village environment. When we ran out of turmeric, coconuts, or chilies, my first instinct was to run to one of the neighbors who had small enterprises where they sold such things (different offerings would crop up on different doorsteps on different days) to buy some, but my host sisters would simply walk to a friend or family member's house and say "I need a coconut/few chilies/stem of turmeric/limes, etc.", and friends and family would do the same when they were out—problem solved as long as no one is greedy and people keep harvesting.

Something we harvested from all of these plots was firewood. Most people in my village use sticks (*nkuni*) to cook their food. Some have switched to gas (though fuel is expensive, dirty (the soot on pots is less cleanable than wood soot), and smelly). Harvesting firewood was one of my favorite activities but there was a learning curve involved. One of the first times I was allowed to help collect firewood, I gathered together some of the cassava cuttings my host father had recently planted (they looked like dry twigs to me). I later found out that there are some

trees we don't use for firewood- cassava, moringa (matabayabwa), and jatropha (I can't remember the name in Shikomori). Those are all plants that can be propagated from woody tissue. I also learned that it is ideal to have a variety of stick sizes, but the best size for everyday cooking is about as fat as your wrist.

Although there are carbon emissions associated with burning wood, in the context of Mwali, burning wood for cooking fires did not contribute to deforestation. As people prune their trees, occasionally remove trees to reduce shading, or when storms topple trees, the branches are left to dry. Eventually when they are dry enough and you are in your field doing something else, you collect the dry sticks and carry them home. You can also collect coconut palm parts that have fallen and dried out. This is admittedly a labor-intensive task, and a bundle of sticks can be heavy to carry on your head, but if a little is done every time you go to the fields (and especially if you have a labor force of children) the work doesn't seem too heavy. A favorite Comorian saying, taken from the French is '*Petit à petit, l'oiseau fait son nid*'-(*little by little, the bird makes his nest*). We never really gathered wood from the farthest field, and it was rare to go to the malavuni just to collect firewood unless we'd gotten behind. The weeks before Ramadan or another big event were the exception. Then mostly women, but men too in times of greatest need, would spend an entire day gathering firewood, which includes dried coconut palm parts, from land near the beach where coconuts are the densest, and putting it in large bundles—hopefully to be carried by a truck to a location near your home.

Our family did not only cultivate and collect food and wood on the plots owned by Mma Loza. We frequently visited plots owned by her daughter and son, who had a lot of the same plants, but some additional or more plentiful crops of some types. For example, my host dad had a plot nestled in a narrow river basin, punctuated by a small waterfall with a lot of vanilla planted

on it where we helped plant banana trees. He also had a plot not too far from the village where pineapple, black pepper vines (pvilipvili), and tamarind (muhadju) grew. These crops were also collected and used/sold, though I'm not sure the tamarind tree was harvested because it was very tall, and no one was motivated enough to climb it. My host aunt had a plot near the village where I picked coffee for Mma Loza, and a plot right on the coast that was extremely beautiful called '*Ha ma nyombe*' (home of the cows). When she and her husband went, they'd frequently take a motorcycle to ride down the hill, and then across the beach most of the way (there's a point where there are large rocks to traverse). This plot was very sunny (I think several large trees had been removed) and young ylang ylang trees were planted on it with corn which also loves sun.

Mma Loza herself did not care for any animals while I lived with her, but in preparation for a once-in-a-lifetime celebration (*mashuhuli*) she was hosting in June of 2019, her son was raising a cow. This cow was moved to different parts of the forest. Sometimes on family land, sometimes on friends' plots. The cow was tied to a tree with access to water and a place for bedding. It was fed mostly with vegetation that was cut and carried (for example grass from Gulanyundi). My neighbor kept a cow on the beach because that land is not really owned by anyone. When we had a cow, many of our vegetable scraps would be put into a bag for the cow, particularly banana peels. When we didn't have a cow, we took our peels to our neighbor who was raising a cow. On one of the first days I was in Wanani, I noticed one of my little host brothers walking around with a leash and an invisible animal. I said 'Oh, is that your dog?' He looked at me, a little confused, and said 'No, it's my cow!' (*nyombe*). When the day of my host mom's celebration came, several men from the village helped to slaughter the cow my host dad

had been raising, and the meat, the one dish of the celebration cooked by men, was distributed to people participating in the celebration, as well as poor or disabled people in the village.

Based on excursions with several friends to their plots of land, and on pathways cutting through parcel after parcel, I feel fairly confident concluding that most plots in Wanani have a lot in common. Some people clear more or fewer trees, and the crops that are planted vary. Very large yams were occasionally for sale by a neighbor. One of my friends planted a hillside of pumpkins underneath her ylang ylang trees. Other people grew old-school vegetables like ndodoki, a long gourd. Many fruit trees such as soursop, karambola, cacao, and various types of custard apple (*Annona* spp.) grow. Cycads (sago palms), *msampou* in Shimwali, small date palms used as toothbrushes and to make mats, bamboo for making ladders, and sisal were common in less disturbed tracts of cultivated forest. On an excursion with my friend to pick cloves, I noticed that she was growing a monoculture of cassava on a bare hillside! On the path through the forest to get to Wangani, I'd frequently see goats tied to a tree in the middle of the forest, munching on vegetation. I also saw and heard goats in the village—it was common to take them out during the day, then bring them close to the house or another secure area at night.

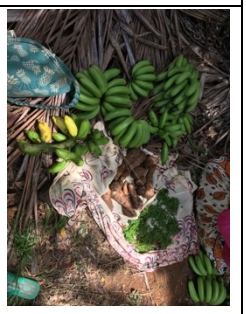
Chickens roamed the village free-range. Neighbor's chickens frequently came into our house and left hard-to-sweep-up droppings in the courtyard. Sometimes it seemed like Mma Loza was trying to persuade the chickens to lay one of their eggs in her room (finders, keepers). We did have a very stubborn chicken who decided to nest right next to our cooking fire—my host sister said if someone else's chicken lays an egg at your house, you should give it to them. The chickens were sometimes troublesome because they were foraging for food. If any food attractive to chickens-- grated coconut, fish, chicken wings, meat, rice, etc. was left unattended, the neighborhood chickens would find it. I rarely saw anyone feed a chicken anything but

scraps—raising chickens seems like an economical way of getting extra protein (boiled eggs are prized).

There were people in my village, all women as far as I'm aware, who used extra space near the village to grow small vegetable plots where they would raise things like lettuce, tomatoes, cabbage, mustard greens, cucumbers, beans, and carrots. People didn't often eat these 'fragile' vegetables as part of an everyday meal, but during celebrations or weddings which usually happen during the school break (our summer months), these vegetables were a very important part of the fancy meals that were prepared. Usually double-dug beds were prepared and planted with seed as a nursery, then seedlings were planted out into additional beds. Water was a limiting factor because these weren't being grown during the rainy season for the most part due to pest pressure. This type of system is the only place in Comoros where I saw disease that significantly impacted yields, and the only place where I saw pesticides other than snail bait being used. In their assessment of the Comorian agricultural sector, the World Bank judged that developing vegetable cultivation would be an excellent source of additional income for households in Comoros (World Bank Group, 2019).

In sum, I hope this case study is illustrative of the great diversity and history of the Comorian farming system. I've only scratched the surface- not touching the origin and cultivation of many plant and animal species on the island, as well as many traditional uses of the crops produced. The history of many crop species as 'canoe plants' from Southeast Asia reveals the long experience the people on these islands have had in rearing many of those species, such as coconut, yam, rice, Polynesian arrowroot, and bananas (see Box 5). The biological and social resiliency of this system seems to me worthy of imitation in this time of instability in both biological and human systems.

Box 5: Banana/*Ndrovi* (*Musa acuminata/balbinia*)



Next to rice, green bananas are the most significant starchy staple in the Comorian diet (Ali, 2017). Banana trees are not technically trees, but very large herbaceous plants consisting of sheaves of leaves around a pseudostem with an underground corm. They bear parthenocarpic fruit (Sauls, n.d.).

Different varieties are prized for different reasons- size, taste, texture, growing habits, etc. The Comoros islands, along with Madagascar may be one of the first sites of banana cultivation in East Africa. There are banana varieties in Comoros that reflect both the wild, domesticated, and mixed genotypes of both normal and plantain species (Perrier et al., 2018). The islands have a particularly diverse assembly of bananas, with over 42 varieties, several of them being endemic (Ali, 2017).

Bananas are generally cultivated in Mwali by taking a large pup (spear sucker) or corm from a desired variety and planting it in a forest or field where it can grow independent of the parent tree, and thus with sufficient resources to bear fruit. When a bunch has grown to a point where the majority of bananas are the largest size possible, but they haven't started ripening to yellow, the bananas are harvested by cutting the tree down. The downed tree can be chopped and fed to cattle. There are a few varieties grown specifically as dessert bananas 'kisukari'- very tiny and sweet- is one example. Green bananas are called 'ndrovi' and yellow bananas are called 'masindza'. The harvested bunch is typically broken apart into hands, which are packed in a rice bag and either used by the family over the next week or so in their meals (more generally at lunch time), or they can be sold to fellow villagers who don't currently have bananas. Sometimes an entire bunch is harvested and left intact for sale in the capital for a significant amount of money (most people who live in the capital still have land nearby where they farm, but there are some people who buy most of their food at the market).

Bananas are especially important during Ramadan, when instead of eating rice for the main meal, people eat fried bananas (and other fried starches) to break the fast every evening. People may plant a larger number of banana trees in anticipation of events like Ramadan, a wedding, or other celebrations. If they don't plan ahead, they will most likely need to purchase from neighbors. In 2019 when hurricane Kenneth hit, many banana trees were toppled before they were ripe, creating a shortage (especially on the big island) and driving up the price of bananas. It is becoming more common in Mwali for people to grow bananas to ship to the other two islands for sale. Thievery of bananas (when someone comes and harvests the entire bunch before the farmer who planted them) is somewhat common and represents a serious loss to the cultivator.

Bananas are frequently eaten as a fried starch. The green peels must be removed, a very difficult task which can result in black-stained hands and nails, but which is executed with great speed and skill by Comorian (mainly) women using a spoon or knife as a tool. The bananas are usually cut and soaked in water (sometimes salted) before cooking. They may also be seasoned with freshly ground spices before frying. These fried bananas are then used as a sop for sauces in which fish, chicken, or meat have been stewed, dipped into sardines blended with tomatoes, hot chilis, salt, and some allium, or more commonly to dip into 'putu': a blend of freshly ground hot chili peppers and salt (sometimes with lime juice or some other acid element and shallots and/or garlic in the mix). Bananas may also be stewed in coconut milk with fried fish, boiled in water, or boiled in a tomato-based stew with some kind of protein (if available).

Humans aren't the only primates to love ripe bananas. Once when walking through the forest with family and neighborhood children, they tried to entice a group of lemurs out of a clove tree with a chant: "Hey Lemur! Come get some bananas!" The Lemurs were wise enough to know we didn't have any.

**Agroecology**

Agroecology has evolved from being a reactionary alternative to the agricultural practices of the green revolution era and reform of the agroecosystem to a movement that is "The integration of research, education, action, and change that brings sustainability to all parts of the food system: ecological, economic, and social" (Gliessman, 2018, p. 599). It is participatory, holistic, and action-based in its implementation of ecological and social ideals (Gliessman, 2018). Altieri and Toledo (2011) described an 'Agroecological Revolution' that was 'epistemological, technical, and social' (p. 587). Local peasants in Central and South America were empowered to challenge modernization and agribusiness with low-input, regenerative agrobiodiversity. This is the type of change that makes sense to me, but much of the curriculum put forth in classes at a traditional land grant university with departments funded by Pepsico and the Bill and Melinda Gates Foundation seem to give lip service to environmental protection but hold up technological innovation in agronomy as the only hope for growing food to meet demands of the human population.

Conflicting analyses of motivations and outcomes of the green revolution abound (Cleaver, 1972; Evenson & Gollin, 2003; Patel, 2013; Pingali, 2012). However, whether or not retrospect reveals the motivations behind the green revolution to be benevolent, or couched in governmental and industrial self-interest, environmental collateral damage is acknowledged. Some claim that the green revolution may have spared biodiversity because less land was needed for agricultural production. There is disagreement as to whether the Green Revolution has had the effect of relieving poverty and hunger, since both persist, and inequality abounds.

Research that examines how intensive, monocultural practices influence ecosystem services such as pest control are lacking. Grab et al. (2018) demonstrated that pest numbers were

lower and yields higher in agricultural lands that integrated seminatural landscapes and diversity. They also noted that these landscapes supported more native parasites to insect pests. Yang, et al. (2020) observed increased yields in Ethiopian wheat fields when planted near forests. Baudron and Giller (2014) posit that in light of the fact that 1/3 of agricultural production is wasted and biodiversity loss is at crisis level, consumption patterns and designing landscapes to maximize ecosystem services are higher priorities than increasing production.

To me it seems clear that natural systems are endlessly complex. Science is exciting and useful because we may gradually discover some of the mechanisms behind what we observe in our environment. However, experience seems to have born out that acting in a way that goes counter to ecosystem functioning is ultimately a losing prospect. Indian cow breeding is a case that represents well the issues of industrial agriculture. Hybrid cows, like the hybrid grains of the green revolution, produce much more food than native breeds of Indian cattle: 25 liters of milk per day vs. 3 liters of milk per day. At surface it seems obvious that the hybrid cattle would provide more food and be more profitable. However, dairy farmers in India note that they have to provide special feed, special housing, more water, and more medicine to the disease-prone hybrids who end up producing less milk and experience reproductive distress in the hot season, a liability in times of climate change. Many of the native breeds produced milk that had more nutritional and even medicinal value, in addition to being more resilient in the face of climate change. Unfortunately, due to widespread adoption of hybrid cows, many of the native breeds have disappeared. Losing those breeds that had functioned so well in a relationship with humans over hundreds of years in favor of more milk (maybe) seems similar to cutting down large forest trees in hopes of earning more money with a cash crop.

**Section III: Meaning-Making (Discussion)**

Seeing in action the advantages to an imperfect but functioning agroecological cropping and social system in Comoros inspires me to spread ideas from Comoros to people here in the U.S. I'm certainly not saying that all is well in Comoros and all is ill in the U.S. Multiple people in Comoros told me "On souffre ici" (we/people are suffering here). I don't know what that suffering means for the individuals who used the phrase. I was motivated to study global development with the idea of somehow benefitting the people I love in Comoros, and hoped to be able to travel to my community in Comoros to sort out with them the ideas I've written about in this paper- what is development to people in Wanani, and how can agriculture be a key to 'developing' in a way that is desirable to members of the community, recognizing that this might be different for different members of the community.

Some questions I would like to ask, not as a means of extracting information, but as a means of stimulating conversation within the community are:

Do you own enough land to meet your needs for food?

Do you have land for your daughters?

Describe how you have used the hospital.

What would you like to be different about the hospital or doctors?

What are the good and bad sides of the education your children are getting?

What do you think should change about education?

Do you think life was better when you were young compared to now, or vice-versa?

What are the best Comorian customs?

Are there any Comorian customs you think should change?

Do you like farming?

If you could choose to do something besides farming, what would it be?

What do you like most about farming?

Which crops are your favorite to grow? Why?

How do you decide what to plant where?

What are some problems you've had with farming?

Is there anything you would like the government to help you do in your farming?

How do you think Comorian agriculture differs from agriculture in France, the US, or China?

What do you think Comorians could learn from France, China, US?

What do you think China, France, US could learn from Comoros?

What do you think is the best part of Comorian history/something good from Comorian history?

What do you think is something that is the worst/not good from Comorian history?

Do you think life is better in Mayotte than Mwali, or Mwali than Mayotte? Why/how?

Do you think life is better in Mwali or France? Why/how?

Do you think life is better in Mwali or the US? Why/how?

Do you think life is better in Mwali or the US? Why/how?

What would you like the future to be like for your children?

What does "development" mean to you?

If you had power to govern Comoros, what would you do first, second, third?

If you had power to govern Wanani, what would you do first, second, third?

Do you think hunger is a problem in Wanani? Why/not?

Do you think a man/woman/or child should have food first if food is limited?

Do you worry about Mwali losing trees and water like Anjouan?

What do you think about the national park on Mwali?

Do you think people should protect animals like the Livingstone Fruit Bat, Lemurs, and Sea Turtles? Why/not?

Which Comorian island is the best to live on? Why?

What makes Wanani a good place to live?

What makes Wanani a hard place to live?

Do you think men and women have the same rights and privileges?

Do you think things are fair for men and women in Comoros? How/not?

What are your biggest worries?

What is most important for your happiness?

This list is not exhaustive, and the best questions would be those formulated by people from Wanani for themselves and their community members. As a student of 'development' my education at Cornell has prompted many questions, as well as possible insights to work from. Where do I fit in 'development', if I've concluded that it might be best to step back from looking afar for places where I can be of help. Agriculture in the U.S. needs to undergo a 'good change'. The social and ecological transformation that adoption of agroecological practices and epistemologies require could be this good change. How can I contribute in ways that make this change possible? One Comorian proverb comes to mind: "Uya weke, ufa weke", Eat alone, Die alone. My natural impulses, and some of the cultural norms in my society tend toward independence and self-sufficiency. I think that in order for things to change for the better in our society, we must come to recognize and embrace the connections that tie each individual being to its neighbors—sometimes near, sometimes far.

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