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Ecuador, Factor #6: Sustainable Agriculture

An Evaluation of the Long-Term Sustainability of Ecuadorian Agriculture

Resting between the Andean Peaks and the Pacific Ocean, Ecuador is a nation of breathtaking beauty and biodiversity. Its diverse landscapes and climates make the country rich in natural resources and allow for a wide range of crops that make agriculture a cornerstone of Ecuador's economy. Sustainable practices are vital to ensure that the nation's economy and environment can continue to flourish and grow in a way that guarantees food security for Ecuador's people.

To begin, Ecuador is home to roughly 18 million people and is located directly on the equator in South America (CIA, 2025). As of 2012, the average household size had 3.881 people (CEICdata.com, 2019). It has a greatly varied climate determined by local terrain and altitude. In the mountain valleys there is a year-round temperate climate and in the coastal areas and rainforest lowlands there is a humid subtropical climate. The coast has a rainy season that goes from December until May and the regions located higher up in the Andes have a rainy season from October to May and a dry season from June to September. In the eastern Amazon region of the country there is rainfall throughout the year. Ecuador's climate is also greatly impacted by El Niño events which increase rainfall and flooding on the coast and western side of the Andes (World Bank Group, 2021).

Agriculture is an important industry in all regions of the country. As of 2018, 29.7% of land was agricultural (CIA, 2025). The industry takes up 7.7% of the country's GDP and employs roughly 30% of the total workforce (World Bank Group, 2021; Trading Economics, 2025). Farming is a pillar of Ecuador's economy that has helped bring money back into impoverished parts of the country. In 2023, banana exports alone were worth 4.51 billion dollars, making Ecuador into the largest exporter of bananas in the world (OEC, 2023a).

Numerous different products are farmed for both export and local consumption. Bananas, shrimp, coffee, cocoa, cut flowers, fish, and other fruits are all primarily produced for export. Local subsistence farmers often grow corn, potatoes, beans, cassava, beef and dairy cattle, sheep, goats, chickens, and guinea pig, one of the nation's most famous dishes (Vélez, 2025). Ecuador also imports large amounts of food from the United States and other nations to feed the growing population. This includes bakery goods, pastas, spirits, processed vegetables, and cereals. The imports of consumer-oriented agricultural products from the United States amounted to 1.1 billion dollars in 2022 (International Trade Administration, 2024). Ecuador is a nation that produces much of its own food supply at home, but they still rely heavily on international trade for both economic growth and food security.

Due to the diversity of climates and crops being produced in the country, there are a wide range of farming practices being used, yet each has its own sustainability concerns. Sustainable agriculture is defined as, "the production of plants or animal products using farming techniques that protect the environment and public health of a country" (The Borgen Project, 2018). Since agriculture plays such an important role in Ecuador's economy and takes up much of the nation's land and resources, allowing unsustainable practices to go unchecked has drastic effects on the country. Three of the major exports, bananas, shrimp, and cut flowers, each have their own issues and require independent sustainable solutions.

The large number of exports of bananas is due to the high demand around the world. To meet this high demand for bananas, Ecuador has seen an expansion of large-scale plantations. However, small-scale farmers are still able to thrive and make up a significant portion of the production. Due to the warm climate of Ecuador, bananas can be harvested year-round, usually weekly. Standard tasks to take care of

the banana plants involve applying weed and worm killer, covering the bananas in insecticide-treated plastic bags, tying insecticide-treated plastic strips around the stalks, propping the plants up on wooden poles, and monitoring the growth phases of the plants. Once harvested, the bananas are sent to a packing plant to be cleaned and processed for shipment (Pier, 2002). The process of producing bananas on such a large scale takes up many resources and produces large amounts of waste. Bananas require a constant moisture level, so the fields are interlaced with irrigation channels, increasing soil erosion. This irrigation causes silt and chemicals to leak into adjacent waterways, potentially harming the local water quality (foodispower.org). Much of the fruit produced is also wasted with sometimes up to a third of the crops being declared unfit to be sold. This happens not just for fruit that is inedible, but also for fruit that is not considered aesthetic enough to be sold (Food Empowerment Project, 2019). The estimated amount of plant waste from the production of these fruits is about the same as the volume of fruit that is shipped (Foodispower.org). Overall, between the pesticides, plastics, water use, and plant waste, growing bananas is a very wasteful process when done on a large plantation scale. The waste not only damages the environment in an unsustainable fashion, but also harms human health as well by contaminating sources of drinking water and exposing workers to dangerous chemicals (Harari 2009). It is important that sustainable solutions are used to combat these issues without preventing Ecuador from being able to meet the high international demand for bananas.

Currently, there has been a general trend in the right direction due to an increase in interest in organic and sustainable bananas on the consumer's end. Lately, Ecuador's banana industry has been making efforts to comply with demanding European Union (EU) regulations on quality and sustainability. These regulations align with the demands of consumers such as those for traceable products and product origin certifications. However, meeting these demands increases the cost on the producer's end. This issue has created a problem blocking a shift to sustainable banana farming. The producers have an increased production cost yet some supermarket chains in the EU sell their products below the actual value in order to attract more customers. These low prices do not accurately reflect the cost of sustainability and according to José Hidalgo, the Executive Director of the Association of Banana Exporters of Ecuador, the low prices give the impression of low quality and unfair wages, which he says are in contrast to reality. Hidalgo has said that Ecuador has been making efforts to adapt to EU regulations, but the EU has to be able to communicate the true cost of sustainability to their customers (Agencia EFE, 2024). A plausible solution to this issue would be for the EU to implement stricter pricing regulations such as price floors that set minimum prices on organic banana produce imported from foreign nations. While increasing prices usually would deter consumers, in this instance it would make the consumers feel safer. The slightly increased prices will signal to consumers that workers are treated well and the industry is operating responsibly. As the demand for sustainable bananas continues to grow worldwide, Ecuador will be forced to further switch to sustainable practices in order to sell their bananas. The economic security provided by the banana industry is what creates food security for many Ecuadorians. The jobs created provide many people with the money needed to afford their food. Food security in Ecuador is not only about growing as much food as possible, but also is dependent upon the economic growth of the country.

Another major sustainability concern is the practice of shrimp farming on the western coast of the country. Shrimp farming began in Ecuador in the late 1960s and since then has expanded rapidly to at least 220,000 hectares of shrimp ponds (Piedrahita, 2018 ; NASA, 2006). In 2024, Ecuador exported 1.2 million metric tons of shrimp, making it the largest shrimp exporter in the world (Jose, 2025 ; WWF, 2022). Typically, in order to build shrimp ponds in Ecuador, mangrove forests on the coast are cleared for easy access to salt water and to make room for the ponds (NASA, 2006). According to the National Coordinating Corporation for the Defense of the Mangrove Ecosystem of Ecuador, more than 70% of the mangrove systems in Ecuador have been destroyed by shrimp aquaculture. Mangrove forests are vital ecosystems that fight climate change by storing carbon, act as nurseries for fish, buffer against dangerous weather events, prevent erosion, and provide food for local communities (ClientEarth, 2023). These

forests are key to the food security of many coastal communities. The removal of these mangroves disrupts the food supply local communities depend upon to generate fish and other seafood.

So far, the shrimp aquaculture industry has made many crucial steps towards sustainable practices. In 2022, the World Wildlife Fund (WWF) and Ecuador's National Chamber of Aquaculture (Cámara Nacional de Acuacultura – CNA) signed an agreement to halt habitat conversion from shrimp farming. This agreement was the first national commitment to conversion-free aquaculture from any country on the planet (WWF, 2022). CNA has also partnered with an initiative called the Shrimp Sustainable Partnership which is trying to establish a new certification standard that will guarantee antibiotic-free shrimp and a neutral impact on water use for production. In 2008 another program was implemented to reforest mangrove areas for certain shrimp farms that had originally not obtained the proper permits to farm, and in some cases up to 30% of a farm's operational area was reforested. As of 2018, mangrove reforestation has recovered about 4,500 hectares of mangrove forests (Piedrahita, 2018). With these restored forests returns the mangrove fish habitats, which means the local people living there can once again have a secure supply of food from the forests.

Unfortunately, the reforestation and regulations mean that shrimp farms cannot expand their land to meet the global demand. Many farmers want to intensify their farming (producing more on the same land) which increases the risk of disease outbreaks among shrimp by cramming more into the existing space. Pollution runoff also becomes an issue as large amounts of waste is produced in such a small environment. Thankfully, there are solutions that can be used to allow for the demand to be met and for shrimp to be produced sustainably without deforestation of mangrove forests. Typically, on small shrimp farms, only a bit of fertilizer is used, ponds are not too heavily stocked, and there is not much added food for shrimp. Productivity remains relatively low, but enough space is used so the farm can produce enough to be profitable. Dane Klinger, an environmental scientist and marine biologist, came up with a solution to boost farmers' production while restoring half of their land to mangrove forest. The solution is to restore mangroves and to supply small to medium size farms with relatively affordable technologies. First larval shrimp are stocked, feed is added, and water quality monitored to ensure optimal growth. Aerators can be used to get optimal oxygen levels. Automatic feeding dispensers can be used to ensure proper nutrition. Pond liners of plastic or concrete can give the farmer a more precise control over the shrimp's environment (McCarry, 2023). The government could also accelerate the implementation of these technologies by providing subsidies to shrimp farmers who use the new equipment. This incentive would lower the financial risk the farmers take on when they install the new devices. The government could also work with private organizations such as the WWF to provide classes to shrimp farmers so they can understand how to use the equipment properly, efficiently, and safely. These technologies combined with reforestation can create a sustainable system of shrimp aquaculture that Ecuador will be able to use long-term to both meet international market demands and minimize environmental degradation. With an increase in productivity on the shrimp farms, farmers will have more money, meaning stronger financial security, and in turn strengthened food security, while the increase in mangrove forests will directly support the food security of local communities by expanding fish nurseries and generating seafood.

Rose farming, a symbol of Ecuador, also has many unsustainable practices that degrade the resources of the country. Ecuador's stable climate and location make it the perfect place to grow roses. Its location on the Equator means the country gets 12 hours of sunlight a day, providing energy for the roses to grow to be some of the largest in the world. In 2023, 1.1 billion dollars' worth of uncut flowers were exported (OEC, 2023b). While floriculture does generate employment and income from trade, the large-scale production competes for water, soil, and land resources that could be used for food production. Runoff from these farms also leads to excessive amounts of pesticides and nutrients such as ammonia, that threaten drinking water (Toledo, 2023). Extensive use of pesticides is common on rose farms (Bergman, 2011). The negative ecological impacts combined with the competition with food production threaten food security and sustainability where flowers are farmed. Some companies, in order to uplift

their public image and prevent further harm, have begun using sustainable practices. Rio Roses is a rose company that sources their roses from sustainable farms in Ecuador and Columbia. On the farm, they use greenhouses that are designed to catch rainwater for plant irrigation. They use drip irrigation to improve water efficiency and get roughly 80% of their water from rainwater reservoirs in order to minimize their need to use water from local rivers or wells (Rio Roses, 2015). The effective rainwater use by Rio Roses resolves the issue of competition over water resources with food producers, helping to alleviate food insecurity. Since the sustainable rose farms no longer need to share water with food-producing farms, more water is freed up for use by the food-producing farms. This means food-producing farms can grow more crops and more food, improving the nation's food security. There is also less contamination of local waterways and soil since chemical use is minimized. The solutions being implemented by Rio Roses are not only improving food security but drinking water safety as well. For floriculture to be sustainable and no longer threaten food security, all floriculture farms will have to shift to the style of farming exemplified by Rio Rose's farms.

However, this shift will be costly for farmers, but if consumers in the United States and other countries push for sustainable roses, farmers will make the shift since they will be forced to meet the needs of the international market that they depend upon for income. Consumers can take action by refusing to purchase flowers that are not labeled "Fair Trade Certified" or "Organic." Private organizations such as Rio Roses can spread awareness and support these labels on flowers by reaching out to social media influencers on apps like Instagram and TikTok to have them create content telling people to only buy labeled flowers. They could also create advertisements that explain to American consumers the importance of sustainably sourced flowers. The economic and food security of Ecuador is not just reliant on the nation itself, but also the actions of people in other countries, such as the United States, that Ecuador trades with. Millions of Americans are on social media platforms every single day, so placing the idea of floriculture sustainability right where everyone is already looking could greatly impact the behavior of consumers. One person changing how they buy flowers may seem like something small, but when thousands or millions of people make the same decision, it could have the power to change the entire floriculture industry in Ecuador.

While the sustainable problems and solutions above pertain mostly to the economically vital banana, floriculture, and shrimp industries, there is still a large population of small-scale sustenance and local farmers that represent a significant portion of agriculture production in the country. As of 2023, more than 84% of farmers in Ecuador were small scale producers with fewer than 10 hectares of land. Many of these farmers do not follow sustainable practices and often lack access to quality fertilizers, farming practices, financing, and seeds (Chile, 2023). These farmers contribute to soil erosion, pollution, and deforestation that threaten the food security of the country (Hastings, 2018). These farmers and communities are also vulnerable to extreme weather that has been exacerbated by climate change (Chile, 2023). There are many solutions currently being set in place to address these issues.

One such solution began in September of 2023 when the EDGE Fund announced it would provide 3 million dollars in funding to support Ecuadorian small-scale farmers and engage in a partnership with major private-sector businesses. The goal of the partnership is to increase environmental sustainability and long-term resilience in the food supply chain of Ecuador. The fund is using the money to train farmers in topics of biodiversity conservation, agroecology, and business (Chile, 2023). In Quito, the capital of Ecuador, the city has begun to improve food resilience by establishing sustainable orchards and urban farms. These improvements have resulted in an additional roughly 640 tons of fresh healthy food entering Quito between 2019 and March 2020 (Resilient Cities Network, 2020). Solutions such as these and many more are currently being used to move Ecuador's small-scale farmers closer to being fully sustainable. Ecuador is a nation that is still developing, yet is seeing great progress in ensuring their population has access to sustainable food.

Another solution would be a shift for small farmers to agroforestry systems. Agroforestry is the practice of integrating trees and shrubs into crop land. A study was done in 2018 to compare sustainability between conventional agriculture systems and agroforestry in smallholder farms in the indigenous territory of the Kayambi people in Ecuador. The Kayambi people are native agricultural people with deep cultural roots in the north of Ecuador. Many of them use conventional farming methods but recently there has been an interest toward agroforestry. The study found that agroforestry farmers become less dependent on rain-fed water sources and use more diversified irrigation sources, which makes them more sustainable and able to withstand impacts of climate change. Agroforestry farms also had more biodiversity compared to that of conventional farms. The study concluded that highland agroforestry systems can provide more favorable environmental and socioeconomic conditions that improve food security by improving sustainability (Córdova, 2018). Agroforestry is another tool that can be applied effectively to improve small-scale agricultural systems in Ecuador. It does not have to be used only for indigenous communities, but could also be applied to farms elsewhere in the nation. Since agroforestry has already been shown to work within Ecuador, expanding it is the logical next step. Again, private organizations such as the EDGE Fund and the World Wildlife Fund could help fund and educate farmers to aid the transition to sustainable agroforestry practices. This will provide small farms with environmental and financial stability.

Agriculture is one of the most important industries to Ecuador. It provides foreign income and food for the entire country. The vast range of environments within Ecuador has allowed the nation to be home to many different crops and agricultural industries ranging from bananas to shrimp to roses. Each of these industries have their own sustainability concerns, and each require their own targeted solutions. Ecuador as a nation has been and is continuing to improve sustainability and food security across their entire country.

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