

Jackson Kurten
A&M Consolidated High School
College Station, TX USA
Honduras, Cattle Industry
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Honduras: A Struggling Cattle Industry

Manuel, a teenage boy living in the rural Caribbean lowlands of Honduras washes his feet in a river just feet from his small one bedroom house constructed from adobe with a thatched roof. The familiar aroma of pupusas draws him back inside. His mother and grandmother prepare the savory staple food, a traditional Honduran dish made from the steer he and his dad raised. Over the last week, it became clear that the dry season has come early, shifting their plans and speeding up the timeline to process his steer for meat. Like many of the kids his age, Manuel just finished a long day of work on his family land, tending to their herd of 30 cows. The one constant in his homeland is mother nature, bringing uncertainty to the family business and forcing Manuel and his family to stay flexible and watch for the end of the rainy season.

In 2023, an estimated 39.79% of Honduras' population lived in rural communities, while the remaining 60% lived in urban areas (Honduras Rural Population). This mix of rural and urban demographics gives way to an incredibly diverse population. Different communities across Honduras can have very different lives and lifestyles, one particularly striking difference is the income disparity between wealthy and poor. Manuel relies heavily on his family to provide both the knowledge and support he needs in his daily life, training him about the animals and the land until he is old enough to take over the family business. Hondurans tend to live in close-knit communities. In many cases, extended families live together with many generations in the same household. Honduran families often rely heavily on mutual support, both within the household and at work, contributing to a collective household income that will help them navigate uncertain times. Like Manuel and his brothers and sisters, children often remain in the home until and even after marriage. Family ties are very important in Honduran culture. Families almost always remain together, with children, especially daughters, expected to care for elderly parents and grandparents late in life.

Situated between Guatemala and El Salvador to the west and Nicaragua to the South, Honduras is home to about 10.6 million residents, nearly 1.5 million of whom live in Tegucigalpa, the capital (Encyclopaedia Britannica). This country is tropical with a hot and humid rainy season and an even hotter dry season. Consistent sunshine and coastal humidity can make for a harsh climate throughout the year. Despite the climate challenges, Honduras' economy is heavily reliant on agriculture with key crops including coffee, corn, bananas, beans, and rice. Coffee makes up a significant portion of the country's exports along with textiles and other agricultural products. The cattle industry is a major source of income in Honduras, estimated to provide around 400,000 jobs annually. Livestock production is crucial for Honduras' economy contributing to around 13-14% of Honduras' Gross Domestic Product (Transforming the Livestock Sector). However, the cattle industry in the country faces many challenges including generally low productivity, minimal feed availability, and environmental concerns such as poor grazing management and a changing climate .

Education in Honduras is limited, especially in rural areas. Families often focus on practical skills because formal education is often inaccessible. As of mid-2023, the illiteracy rate was near 12.9% (Illiteracy Rate). These significant barriers to literacy and education prevent a number of industries from gaining the tools and knowledge to support gains in technological developments. Compounding matters, Honduras is one

of the poorest and least developed countries in Central America, largely due to political instability and natural disasters. Being directly on the coast, Honduras is often hit by hurricanes and tropical storms. Most recently, Hurricanes Eta and Iota in November 2020 devastated large portions of the country. Large scale flooding and landslides caused the destruction of infrastructure and croplands leading to increased poverty levels that left many households in need of food assistance, making food insecurity a prevalent issue in the country now and into the future.

Cattle farming is a significant part of the Honduran economy, both domestic consumption and foreign exports rely heavily on the livestock industry to supply hundreds of thousands of jobs. The cattle industry accounts for around 13-14% of the Honduran GDP (Texas Tech University). Beef and dairy amass a majority of both the exported and nationally consumed products in Honduras. Although the beef and dairy industries are crucial for the Honduran economy, there are many challenges hindering production, particularly impacting small to midsize farmers. Limited access to credit, fluctuating market prices, and poor infrastructure all contribute to a decline in cattle production quality and efficiency. Meanwhile, large scale cattle operations continue to grow, using up valuable resources and leaving little room for smallholders' success (CSIS). The livestock industry in the country is on the rise in terms of production to meet local demands, but climate change impacts such as prolonged drought and excessive flooding are putting pressure on farmers. Government efforts to promote sustainable farming practices are emerging, but implementation remains limited outside of the most advanced agricultural facilities.

Weak environmental protection laws and lack of enforcement have led to a lack of sustainable practices. Many farmers are resorting to traditional, inefficient grazing techniques, leading to soil degradation and poor beef quality. This paired with rising climate change concerns leaves small farmers tasked with providing sufficient product quantities to meet the demands of a growing market. Many rural farmers depend on a thriving cattle industry for their livelihoods. Although large scale urban farmers do suffer from poor market values and higher feed prices, small rural farmers are affected more and face a higher risk of economic instability due to their smaller herds and dependence on weather, investment prices and market values. In short, small farmers struggle with access to resources, while larger operations continue to dominate the industry (Global Agenda for Sustainable Livestock). Here in the United States, smaller, more independent farmers can count on the educational resources and even monetary support of government agencies such as the National Institute of Food and Agriculture (NIFA) and USDA. The government of Honduras, on the other hand, does not offer a lot of information or support to the larger population, so smallholder farmers are left to learn and experiment on their own.

On top of all of this, deforestation, water pollution and soil degradation are all side effects of poor management practices resulting from an unprotected and unregulated industry. One of the leading causes of deforestation in Honduras, the cattle industry continues to grow, expanding into new land, taking out dense forests along the way. In 2023, Honduras "lost 73.5 kha of natural forest, equivalent to 47.3 Mt of CO₂ emissions "(Global Forest Watch). Soil degradation is a common problem, especially in places where cattle farming has occurred for generations. Poor grazing management is a common cause of soil erosion due to overgrazing, leading to a loss of vital nutrients and soil fertility. Water pollution is another major side effect of cattle production. Manure and feed byproducts often make their way into water drainages, polluting large water sources. This is not only harmful to humans in the area who rely on these water sources, but can also be harmful to the environment, as chemicals and harmful bacteria are easily spread especially in the moist, humid climate of Honduras.

In today's modern society, there are many practices that could support challenges faced by Honduran families like Manuel's, and in turn, help lift their economy and provide more stable access to food. As

research and technology continues to develop, it becomes more accessible to those in need, offering solutions to problems holding the Honduran cattle industry back. Some of these solutions involve alternative feed sources and selective breeding. The fundamental idea is simple; by bringing in new cattle feed sources and allowing these grains to grow locally, we can reduce import costs and offer a cheaper more reliable feed that will help growth rates in cattle without the need for more land. The crop that can make this happen is corn, specifically yellow corn.

Currently in Honduras, white corn is more widely consumed by humans than any other grain including wheat (Inestroza). Although this may seem reasonable due to the widely varying diets between the U.S. and Honduras, yellow corn is almost exclusively used for animal feed and imported yellow corn makes up almost 95% of the yellow corn consumed in the country (U.S. Department of Commerce). This staggering fact points out that even though yellow corn is regularly used in cattle production as both a feed and a finisher, 95% of it is being imported from foreign countries, stacking up unnecessary costs, and remaining a limitation for animal growth and efficiency in the cattle market.

A possible solution to this is to invest in locally grown yellow corn. If this grain is grown in the country, transportation costs will reduce, lowering the price of livestock feed, particularly as the markets become less certain during global trade negotiations. This could be a simple, but effective, way of making the cattle industry more affordable, especially for smaller, rural cattle farmers. On top of this, crops such as yellow corn and soybeans can often be susceptible to heat and humidity. To solve this challenge, partnerships with crop manufacturers and scientists to selectively breed crops for tolerance in variable climates would allow these crops not only to thrive in the hot and humid climates of Honduras, but to produce more annual yield allowing farmers to realize more product for less investment. When implemented on a national scale with careful coordination, the larger population will benefit from volume pricing. Barriers to collaboration can be reduced through thoughtful and purposeful attention to this topic, one that has the potential to support food security and the economy of Honduras, alike.

Poor grazing management practices are another reason why the Honduran cattle industry is struggling. Although farmers may have been exposed to the cattle industry for decades, rural isolation makes it hard for new technology and management practices to be introduced. Many small farmers use traditional practices that have been a part of Honduran culture for generations. Monoculture pastures are most often used; this method of pasture cultivation can be detrimental to both the environment and to the animals grazing. A monoculture pasture refers to the practice of planting and maintaining a single grass species for livestock grazing. Although it may be simple and easy to manage, this practice can deplete soil nutrients and increase the risk of erosion, can be costly and environmentally damaging, and often leads to deforestation as pastures expand. Extensive grazing paired with limited or lacking infrastructure is another key problem in need of solving when it comes to poor management practices. Herds are often left to graze freely on large open areas. This can lead to uneven grazing pressure and overgrazing in certain areas. Limited fencing systems further contribute to poor, uneven grazing management. Public education efforts as those seen among agricultural extension organizations do not often exist in developing countries, meaning that farmers and ranchers without significant education may never learn about ways to improve grazing management practices that could lead to more effective and efficient practices.

Development of education and outreach programs designed to share modern practices with small scale ranches and herds could solve this problem quickly and efficiently while being very cost effective. Non-governmental organizations (NGOs) such as the World Wildlife Fund and their sustainable ranching initiative are already doing this in more developed countries such as the U.S., Canada, and Mexico

(Sustainable Ranching Initiative). Programs such as these can reach many people, and be greatly successful with minimal costs. Although the aforementioned initiative is isolated to the U.S. and Canada, similar projects can be created with a similar goal in mind. The World Wildlife Fund encompasses almost every aspect of the solutions needed in Honduras. Their focus on increasing plant biodiversity can be tied back to the shift away from monoculture pastures. Similarly, their goal of promoting sustainable practices makes for a perfect fit as a leader in the push for an improved cattle industry in Honduras. A simple conversation on sustainable grazing practices can lead to improved efficiency, and longer soil life across the country, ultimately boosting the Honduran cattle industry's productivity as well as improving crop growth and diversity.

Growth of new influential technology in recent years has allowed for incredible new ways to improve cattle growth. By selecting desired traits in cattle breeds, we can artificially change the way cattle in the region interact with and tolerate their environment. Artificial Insemination (AI) is a commonly used practice here in the U.S. and around the world. Sperm taken from the male bull with the desired traits, is inserted manually into the cow, creating offspring whose traits are better suited for growth, heat tolerance, and other environmental potentials. In this case, traits could include both heat and humidity tolerance from breeds like Brahman and Brangus, as well as early maturity and efficiency from Hereford and Angus cattle. This practice has been extremely effective in America. New breeds of cattle are undergoing improvement. For example the Brangus breed which is known for its heat tolerance, is a cross between a Brahman and an Angus cow. Using AI, we can produce more efficient cattle that are better suited for the harsh Honduras conditions, leading to improved survival rates and meat yield annually.

Given that each of these solutions has its downsides, and all require very different plans of action, the best and overall most effective course of action would be to use a combination of the three suggestions. Organizations similar to the previously mentioned World Wildlife Fund's sustainable ranching initiative would travel to various remote villages in rural parts of Honduras. They would survey communities, looking for farmers who are interested in both scaling up production and who are already exporting small herds of cattle to ensure commitment in the program. To be most effective, the Honduran government or other local partners would need to be cultural advocates for industry change. Non-governmental organizations and their new technological practices are foreign to many rural farmers. Many farmers would likely be reluctant to convert to new practices, after farming a particular way for generations. Local support alongside the NGOs would be crucial in pushing the new practices, possibly aiding in teaching of the new technology.

Support for artificial insemination and modified corn seed would be distributed to communities following identification of willing communities. Initial teaching of these practices would begin immediately upon arrival of the supplies. Once communities have successfully learned how to effectively use these practices, NGOs and governmental support would slow down, giving time for observation. Communities that accept the practices and are committed to the program would continue to receive continued instruction, prompting more commitment and enthusiasm in technology adoption.

One key step in this process would be the integration and partnership between locals in the field and experts from out of the country. There is great value in a mutual partnership where feedback is given to those who are offering guidance. Without support from local farmers, communicating problems and sharing what is or isn't working, locals may be less susceptible to the technology being shared. Essentially feedback and a partnership between locals and outside experts is crucial in giving guidance and sharing information.

The largest limitation to this method is simply the fact that not enough communities could be reached. With a limited amount of monetary funds and likely even less people in the field to support, only a small number of communities would be able to be reached. When executing this plan, there are a number of possible outcomes that could hinder productivity. One main concern would be that rural communities would not only be unlikely to accept foreign technology but be unwilling to even interact with NGOs. This is a very reasonable concern, given that often, rural Hondurans may be skeptical of outsiders intentions or if partners are not willing to put in the work to build trust. For this to work well, collaborators would need to work hard to educate local smallholders about higher potential efficiency.

With these initiatives designed to improve agricultural and livestock production, along with support and possibly even funding by both the U.S. government and the Honduran government, Honduras can move towards a more sustainable and efficient cattle industry where there is less strain on the supply network from outside of Honduras, and where greater infusion of feed and supplemental nutrients will translate into higher cattle growth rates and less soil degradation. More beef and cattle products can be exported out of the country to increase GDP if the Honduran government supports the cause and backs its rural smallholders. Without measures in place to uplift these small rural farmers, the cattle industry will continue to have low productivity and lower beef quality. Honduras' economy heavily relies on livestock production and without a change in the way rural farmers view technology and management progression, the likelihood of major economic consequences for Honduras and for the world greatly increases. While it may seem like a challenge to greatly alter traditional practices, it is vital to progress and will undoubtedly change the course of the cattle industry in Honduras and across the world.

Families like Manuel's work hard to provide for themselves and contribute to the economy, but they often lack the tools or knowledge to improve their outcomes. With minimal investment and some help from knowledgeable experts in the field, small rural farmers and their families can improve self sufficiency and economic wealth. There is hope for thousands of Hondurans who are forced to compete in a struggling cattle industry; simple guidance and a helping hand from those who are willing to contribute can make a difference, lasting generations.

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