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Vietnam, Sustainable Agriculture

**Vietnam: Using the Environment to Your Advantage**

Across the world, environments and ecosystems vary. From the Sahara Desert to the Great Plains to the Mekong Delta in Vietnam, environments differ meaning that life must adapt and evolve to survive. Humans are no exception to this with needing and wanting more every single day. So, when the environment surrounding a human's home is not ideal for agriculture, how do they survive? In Vietnam growing traditional crops is not a luxury available due to the extreme geographical and weather conditions. Each year 150,000 people in Vietnam worry about food shortages due to tropical storms and extreme flooding (Tinh). How can this country work to overcome its nation's food security crisis? Vietnam must use the environment to its advantage to create sustainable agriculture that can provide long-term environmental, economic, and social success.

Vietnam is a country built on agriculture, family, and tradition. With a population of 101,403,000 the Vietnamese stick to their roots with 62.4% of the population residing in rural communities where they practice traditional agriculture performing much of the labor by hand (Buttinger et. al). A majority of the country's lowlands are in permanent cultivation with around 39.43% of Vietnam's land being cultivated and the average farm size being 1,560 m2 which is smaller than an average backyard in Iowa. The staple crop of Vietnamese agriculture is rice, however, other commonly grown crops include sugarcane and cassava. Other major agricultural exports include seafood such as shrimp, crab, and lobster. Agriculture has had to adapt to Vietnam’s unique geography such as the Annamese Cordillera, the Red and Mekong Deltas, rivers, and alluvial plains. Due to lack of drainage soils can be incredibly rich and fertile or lack the basic substrates to sustain life. Vietnamese agriculture is heavily influenced by monsoons and El Niños which affect rainfall. Vietnam has a mix of tropical and temperate climate zones (World Bank Climate Change Knowledge Portal). A typical Vietnamese meal consists of rice, an assortment of vegetables, and a side of meat or fish (Tu). Meals are served in a family-style fashion where trays of food are passed around for each individual to take what they wish (Vietnamese Dining Etiquette). This food is typically grown at home in gardens or on the family’s farm. Families tend to grow their food due to the average income of a Vietnamese household being incredibly low at 6.5 million Vietnamese Dong per month or $275.00/month USD. Even though a majority of food eaten in rural households is homegrown, according to Hanoi, a researcher at The World Bank, “1 in 3 children of ethnic minorities in Vietnam suffer from stunting, while 1 in 5 are underweight.” The 37.6% of the population that resides in urban areas work in construction, tourism, and IT (Buttinger et. al) Vietnam is a communist single-party state that identifies itself as the Socialist Republic of Vietnam. The head of government is the prime minister Pham Minh Chinh and the head of state is president Vo Van Thuong (Embassy of the Socialist Republic of Vietnam). Due to its communist nature, the government strives for universal health care with 82% of the population being covered (WHO). It also aims to provide free education for all students with only 37% of children in Vietnam not being enrolled in secondary schooling (Education in Vietnam). Water, sanitation, and electricity are available to 95% of Vietnamese families with the government working to spread electricity to more rural areas in Vietnam (UNICEF Vietnam). With the outlook of “more children, more fortunes” Vietnamese households tend to consist of multiple generations all living together in one residence (Embassy of the Socialist Republic of Vietnam). This leads to a strong sense of family which is valued in Vietnamese culture. Typical households vary in building materials based on the region in which the family resides. Roofs are built to withstand heavy rainfall and avoid water logging during the monsoon season. Rooms are typically characterized by columns and connected rooms that contain a nha tren, a place of ancestral worship (Embassy of the Socialist Republic of Vietnam). All aspects of Vietnamese life including agriculture, households, and culture affect its food security.

Agriculture in Vietnam is faced with many challenges including global warming, fertilizer pollution, erratic rainfall/extreme weather events, and traditional farming methods. Global warming is the increase in temperatures and weather patterns over a long period. According to Dr. Minh, the director of the Climate Change Adaptation Division, in the past 26 years, the average temperature in Vietnam has increased by 0.7 degrees Celsius from 25.3 to 26.0 degrees Celsius. This increase in temperature has led to sea levels rising 2.9mm/year around the coast of Vietnam creating the threat of salt intrusion on the Mekong Delta. This Delta accounted for 13.9% of Vietnam's income in 2023 (Minh). Losing this Delta would lead to a loss of agricultural land used for rice and shrimp farming and have detrimental effects on the families that depend on the Delta for both food and income. Climate change has also a more detrimental impact on developing countries such as Vietnam (Anh et. al). These countries are incredibly dependent on agriculture to provide economic success. This harms both the development of urban and rural areas. With no sign of temperatures decreasing the threat to Vietnam’s Deltas shows no sign of stopping anytime soon. Fertilizers used to increase crop productivity have also increased pollution and harmed wildlife. Fertilizer has been applied to rice being grown in both the Red and Mekong Deltas in Vietnam. With this fertilizer being applied directly to water more than half gets swept out into Vietnam’s complex river systems with most of the runoff ending up in the ocean. In 2023, 1.8 metric tons of fertilizer washed into the ocean (Hoi). Around 85% of current fertilizer mixes on the market in the Red Delta are ranked as highly toxic by the World Health Organization's standards (Gulland and Kahlil). These toxic fertilizers have affected multiple species of fish such as red snapper and red tilapia that are common sources of food for Vietnamese people in both rural and urban areas. In 2016, ten tons of dead fish were found along the shore of Ha Tinh due to fertilizer poisoning (Tao et. al). The death of fish, a staple of the Vietnamese diet, has led to a lack of food security in rural areas. In the city, there are fewer fish to sell at markets leading to economic downfalls. Even though there are no reports of massive deaths of fish, locals have begun to notice less red snapper and tilapia in the rivers. Erratic rainfall and extreme storms have led to an increase in flooding in Vietnam destroying crops and livelihoods. The amount of precipitation received by Vietnam has increased by 49.19% in past years (Giang and Vy). This led to an increased amount of flooding throughout the country from 2020 to the present day. Between both urban and rural areas 114 deaths have occurred, 889k people affected, 113k Ha of agricultural land affected, 362 schools flooded, and 691k livestock killed (Viet Nam Flood, Landslide and Storms). The frequency of floods and other extreme weather events in Vietnam is expected to increase 5 times by 2050 (Giang and Vy). Lastly, the traditional practices used by local Vietnamese farmers lack long-term sustainability and economic success. Vietnam farmers tend to cultivate, tend, and harvest their crops by hand. This means there is a significant lack of efficiency. This leads to supply-chain disruptions due to a lack of investments in logistics (Weakness in Vietnam’s agricultural supply chains). According to Mr. Julien Brun, a managing partner at CEL Consulting, “The main constraint on Vietnam’s agriculture supply chains is the lack of an integrated, end-to-end supply chain model,” (Weakness in Vietnam’s agricultural supply chains). However, when focusing more on the economic side quality control has decreased from farmers. Farmers try to produce on a larger scale to keep up with Vietnam’s rapidly growing economy, leading to quantity over quality. Traditional farming methods are sustainable short term but not long term. Without help, the environment can not replenish the resources that are taken from it at a fast enough rate to sustain Vietnam's growing economy. These traditional methods destroy the environment within a few years, thus, farmers then move to a new area to cultivate. Climate change, fertilizer pollution, erratic rain/extreme weather events, and traditional farming methods have led to a lack of food security in Vietnam.

One of the main ways to encourage economic growth and promote food security is by instating flood-based agriculture within the Red and Mekong Deltas. Flood-based agriculture is, “systems that make use of temporarily predictable flood water to support farming, fishery, (agro)forestry, grazing grounds, recharge, and groundwater storage,” (What are Flood-Based Livelihood Systems). By helping to regulate flood risk management through the functions of the deltas. Flood-based agriculture would help to improve conservation and restoration efforts of the Deltas while still allowing them to be farmed. This type of agriculture would allow for the recharging of aquifers, the increase of aquatic biodiversity, and the re-establishment of natural hydrology (Meyer). By reestablishing the natural biodiversity of the deltas fewer fertilizers would be needed and the fish market would begin to thrive with the increased population due to natural fisheries. Untapped potential lies within the delta's closed flood zones. These zones have less risk of extreme and unpredictable flooding. These areas would allow security for the farmer because they would have to worry less about unpredictable tropical storms ruining their crop. Locals would still be able to practice traditional cultivation methods while allowing for increased efficiency. This practice was first implemented in 2013 in the Mekong Delta Plan. This plan encouraged the use of high-value double rice cropping and has given a legal framework for this type of agriculture. However, this plan did not account for the reliance locals have on their farms. It did not support them in the transition to flood-based agriculture. Farmers lacked the funds and knowledge to make this transition successful for them and their families. The International Union for Conservation of Nature should offer aid and grants to farmers willing to transition to flood-based agriculture in an incentive-based program. Classes and support through a local representative should be offered also so that farmers can make a smooth transition. Flood-based agriculture has helped to use Vietnam’s natural environment to farmers' advantage in the provinces of An Giang, Dong Thap, and Long An (Meyer). This process could help farmers use the natural flooding to their advantage across the Deltas and rivers of Vietnam to promote food security while practicing sustainable agriculture. Another viable solution to increase productivity and sustainability is organic fertilizer. An organic fertilizer is a “naturally available mineral source that contains moderate amounts of plant essential nutrients,” (Shaji and Mathew). The fertilizer can increase plant productivity and output without causing pollution and harming local wildlife. They avoid the harmful effects that are caused by synthetic fertilizers. Organic fertilizers promote natural soil biodiversity and promote carbon sequestration from plants. By promoting carbon sequestration CO2 emissions would be reduced. Thus, helping to reduce the greenhouse effect and lessening the impact of climate change on Vietnam. The Organic Farming Research Foundation was created in 1990 and focuses on researching new areas of world food production. This organization is keen on working with small farms around the world. It would allow farmers to receive the proper education on how to apply organic fertilizers. They have 355 grants to offer to farmers who would choose to make the transition allowing Vietnamese farmers both a financial and educational support system. To ensure a quicker transition the Vietnamese government would have to regulate what fertilizers are allowed to be sold. This would help to eliminate hazardous fertilizers and replace them with more environmentally friendly options. These fertilizers would be developed by analyzing what nutrients are needed for increased crop growth and what nutrients and bacteria are already present in the soil and water in the deltas. This would allow for the fertilizer to replenish the soil's natural nutrients and bacteria by using harmful chemicals. Since the nutrients and the bacteria that will be found in the fertilizer are already found within the deltas, it will not harm natural wildlife. The use of natural nutrients will also help the locals to be more expected of this new product. Since Vietnamese culture has strong beliefs in natural cures, the fertilizer will be natural rather than synthetic. After using the fertilizer for a couple of years the soil biology will be rebuilt, therefore, the fertilizer would need to be used less often and in smaller amounts creating a more natural and sustainable cycle. This would allow for the farmers to use the already existing benefits of the deltas soil. To ensure that farmers’ understand how to properly use the fertilizer an educational program can be set up allowing for farmers to access information, supplies, and consultations with knowledgeable individuals. Lastly, there can be a focus on reconstructing Vietnam’s agriculture. Without adapting to become more resilient to climate change Vietnam will lose 14.5% of its GDP per year. This project would be run through The International Union for Conservation of Nature. The first way to restructure Vietnamese agriculture to be more resilient to climate change is to strengthen the environment's natural systems. This includes the deltas, alluvial plains, and rivers. The aquatic nature of Vietnamese agriculture has a significant impact on the local climate. This would require local communities, the private sector, and the government to work together to reestablish Vietnam’s natural hydrological systems. This would be done through conservation, reforestation efforts, and increased awareness. The second way to reconstruct Vietnamese agriculture is to protect the most vulnerable ecosystems. Protecting Vietnam’s mangroves will help to conserve 950,000 hectares of forested land (U.S. Mission Vietnam). Increasing carbon sequestration and reducing carbon emissions in the agriculture sector. Both of these processes can be made more efficient by implementing government structural reforms to ensure that farmers and businesses are working to make a change. The government can also create a reward based system that provides supplies and funding for those who participate. To ensure that farmers' traditions and culture is valued, a team of social scientists will work to preserve some of the traditional farming methods by working alongside farmer’s to make sure their voices are heard. By working to reconstruct Vietnam’s agriculture sector by improving its natural infrastructure and protecting its land. These solutions will allow for Vietnam to become more sustainable by using its environment to its advantage.

Around the world ecosystems and agriculture differ. It is how one chooses to use that ecosystem that determines if one will succeed in achieving long-term environmental, economic, and social success. Vietnam has faced many agricultural challenges including global warming, fertilizer pollution, erratic rainfall/extreme weather events, and traditional farming method efficiency. Solutions such as flood-based farming, organic fertilizers, and reconstruction offer hope for Vietnam to become a more sustainable country. However, it can not do it without the help of its environment. Vietnam must use its environment to its advantage.

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