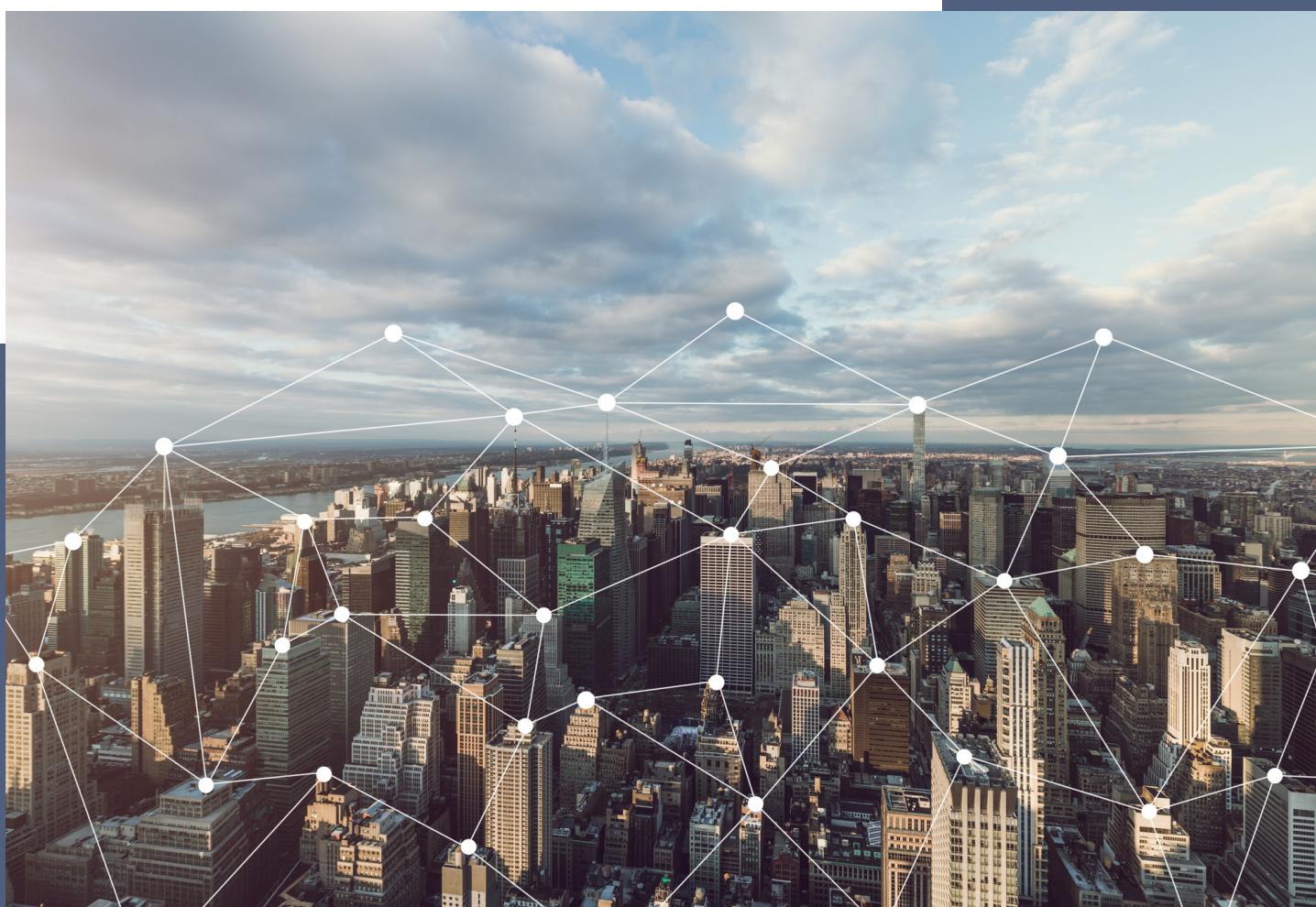




Tracking the Path to Sustainability



Blockchain

Adopted in 2015, the United Nations' 2030 Agenda for Sustainable Development calls on member nations to work together to improve the lives of all people worldwide. This agenda serves as the framework for member nations' political policies and development strategies through 2030.

In the Agenda for Sustainable Development, drafters outline five pillars that countries must address in future development agendas and policies that would also serve to end poverty and protect the planet.

These pillars include People, Planet, Prosperity, Peace, and Partnership. In addition to these pillars, the agenda defines 17 sustainable development goals. These goals address everything from promoting equity and equality to building resilient infrastructure.

Of these sustainable development targets, Goal 2 is one of the loftiest. Goal 2 of the 2030 Agenda of Sustainable Development is to end hunger, promote sustainable agriculture, and achieve food security.

For decades, the "prevalence of undernourishment" was declining. However, these figures started to rise in 2015, which is likely what prompted members of the U.N. General Assembly to include this issue in the Agenda of Sustainable Development.

According to U.N. figures, approximately 8.9 percent of the world's population is malnourished. This figure translates into roughly 690 million people. The U.N. states that they are not only behind schedule but that the total number of people that will be negatively impacted by hunger will exceed 840 million by 2030.

Member nations must overcome several significant hurdles to reverse course and meet Goal 2 of the 2030 Agenda of Sustainable Development. Inclement weather, conflicts, and food waste all contribute to the hunger crisis. Unsustainable growing practices also play a significant role in the food shortage.

Fortunately, emerging technology known as "blockchain" may provide one answer that the member nations have been searching for as they strive to achieve the goals needed to solve world hunger. We examine the nexus between blockchain and sustainability in farming, fishing, and coffee-growing practices and how using technology worldwide can ease the burden of hunger and sustainability.

SUSTAINABILITY IN FARMING



As the global population continues to skyrocket, farmers, food manufacturers, and frontline retailers must adopt sustainable practices. Current farming practices place undue strain on the Earth's finite natural resources and cannot continue to support current food production volumes.

Part of the sustainability equation involves encouraging the creation of international fair trade acts. However, accomplishing this feat will require farming supply chains to

implement advanced tracking capabilities.

What Is Fair Trade and Why Is It Important to Sustainability?

Typically, the phrase "fair trade" is linked to developing nations that pay laborers egregiously low wages and subject them to extremely dangerous working conditions. However, fair trade also applies to developed countries and major players in the international food industry.

At its core, fair trade laws are designed to protect those who work on large manufacturing farms. These laws usually include provisions for safe working conditions, fair pay, and the ability to bargain collectively.

On a grander scale, fair trade laws also protect governments and businesses by providing them with a level playing field. These laws may prohibit farmers or food manufacturers in another nation from flooding the market with underpriced goods that are backed by subsidies. Fair trade laws encourage sustainable practices in several ways.

First and foremost, fair trade laws often include provisions regarding how farmers grow their food. They must take steps to manage water quality, guard against pests, limit the use of harmful chemicals, and improve the soil.

Additionally, fair trade laws can protect farmers from being undercut by growers who violate these provisions. However, for this benefit to be realized, fair trade acts must be universally adopted by major food-producing nations across the globe.



How Can the World Join Fair Trade Acts?

Encouraging private farmers to join fair trade acts can be challenging. To increase buy-in, member nations should explore ways to incentivize farmers to join these organizations.

One example of reputable global fair trade is the World Fair Trade Organization (WFTO). The WFTO independently verifies that each applicant adheres to established fair trade protocols.

The exact membership requirements of each fair trade organization vary. However, the majority of them focus on whether an enterprise puts laborers and natural resources above profitability.

How Can Blockchain Help

In the traditional food supply chain, farmers have very little information regarding what becomes of their crops after they are sold. This lack of transparency makes it challenging for farmers to maximize profitability.

By tracking crops via blockchain, farmers can decentralize food supply chain data. They can learn more about where their crops end up. In turn, suppliers can use this information to build stronger vendor relationships and connect with clients who adhere to fair trade practices.



Farm to Plate would like to thank **Jason Freeman**,
CEO, Farmer Direct Organic™, Canada

Put simply: blockchain may hold the key to creating a “closed-loop” food supply chain where fair trade businesses support each other. Ultimately, this will lead to farmers being paid a better rate for their products, encouraging them to fund future sustainability efforts.

What Does Sustainability Look Like in Farming?

Achieving sustainability in farming will require a multifaceted approach. Farmers must become good stewards

of the Earth's natural resources. Examples of this include efficiently managing water supplies, nurturing the soil to improve its quality, and minimizing food waste.

Blockchain can also play a significant role in achieving sustainability in farming. Specifically, farmers, food manufacturers, distributors, and retailers can use blockchain to optimize delivery strategies.

This optimization will lead to less spoilage and food waste, which means that a more significant percentage of crops actually make it into the hands of consumers.



Farm to Plate would like to thank **Craig A. Morris**, CEO, Association of Genuine Alaska Pollock Producers

SUSTAINABILITY IN FISHING



In 2018, global seafood production exceeded 179 million metric tons. This figure represents the ever-increasing worldwide demand for seafood. While some producers have begun to leverage innovative, new aquaculture strategies to fulfill a portion of this demand, overfishing remains a key sustainability concern.

Wild-Caught vs. Farm-Raised Fish

As the fishing industry becomes more focused on improving sustainability, there is plenty of debate about whether wild-caught or farm-raised fish offer a better long-term solution. While each approach has pros and cons, there are no clear-cut answers.

When wild-catch fisheries use standardized best practices to manage fish populations sustainably, they can minimize their environmental impact.

However, fisheries that are not accredited do not necessarily adhere to established sustainability protocols. As a result, their efforts could negatively impact ocean ecosystems.

Farm-raised fish harvesting protocols are often praised for their sustainability. Most farmed fish are cheaper than wild-caught alternatives and can be made available to consumers year-round. By transitioning to farm-raised fish harvesting methods, producers can minimize the strain on natural fish populations.

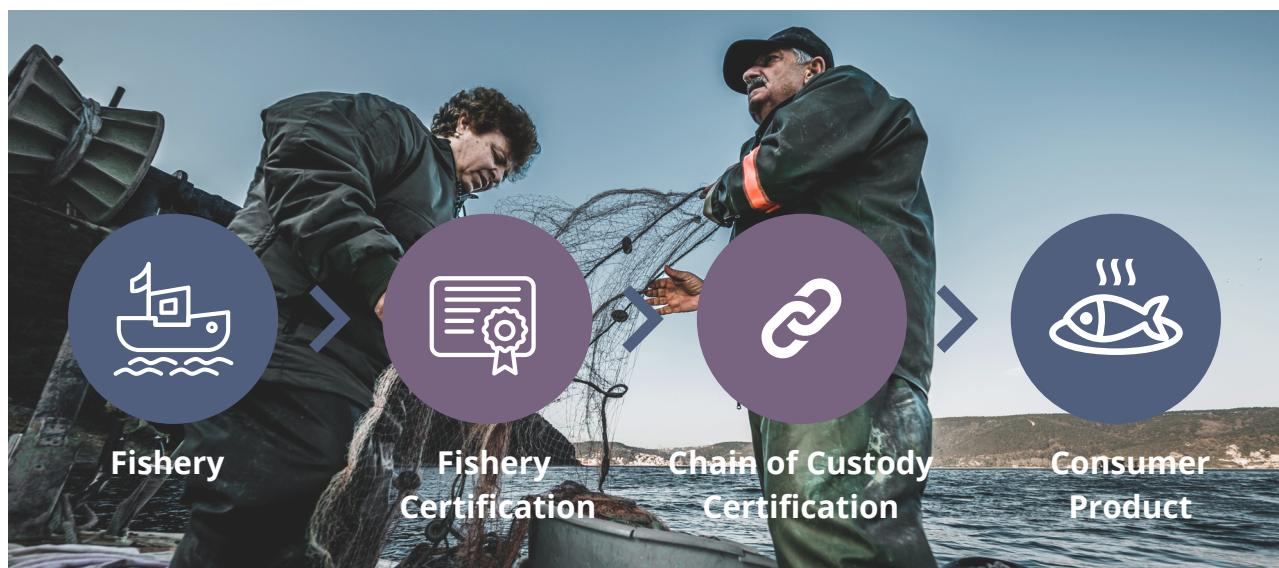
Farm-raised fishing is not without its drawbacks. Poorly managed aquaculture facilities often disperse waste and harmful chemicals into the environment. These practices could harm wild schools of fish and other organisms that are located in close proximity to the facility.

Importance of Councils and Accreditation on Consumer Impact

Stewardship councils and accreditation processes will play an integral role in the effort to transform the fishing sector into a sustainable industry. These establishments will help hold fisheries accountable for their environmental impact while also ensuring that they provide consumers with safe, ethically-produced fish.

In turn, consumers must demand that markets and stores sell only fish affixed with a label that proves accreditation. This drive will force a top-down strategy that boosts the rate of certification.

Organizations such as the Global Sustainable Seafood Initiative (GSSI) recognize several reputable certification programs.



GSSI-recognized programs are an excellent starting point for fisheries that are exploring ways to contribute to the goal of ending hunger and improving industry sustainability.

How Can Fisheries Trace Products Back to the Point of Catch?

Tracing fish back to the point of catch can help the fishing industry identify when stocks are in decline. Industry members can then use this information to alter fishing practices to protect the fish population.

Blockchain makes it possible for fisheries to trace products back to the point of catch with unparalleled precision. This technology creates an immutable record, which fisheries can leverage to document harvesting trends. Blockchain will provide the insights necessary to make the fishing industry more sustainable.

What Does Global Sustainability Look Like in Fishing?

To achieve a genuinely sustainable fishing supply chain, the industry must leverage a combination of wild-catch and farm-raised harvesting practices. On their own, each approach will not be able to satiate the growing demand for seafood.

However, when used in conjunction with one another, these two approaches can optimize fish harvesting capabilities while also minimizing environmental impact.

Fisheries must trace all harvests back to the point of the catch. They should also closely monitor harvesting trends so that they can avoid overfishing. On the farm-raised side, fisheries should ensure that they use sustainable practices and adequately dispose of all waste.



SUSTAINABILITY IN COFFEE GROWING



Every year, there are more than 100 million 60kg bags of coffee produced worldwide. Production has reached these levels due to the insatiable demand for the caffeinated beverage, and demand tends to be the highest in developed nations, such as the United States.

With so many natural resources devoted to coffee production, this market is inevitably linked to the U.N.'s goal of ending world hunger and improving food supply chain sustainability.

However, there are several significant barriers that this industry must overcome to become more sustainable.

What Are the Major Hurdles Facing Coffee Growers?

Unstable governments present the biggest challenge to coffee growers seeking to engage in more sustainable business practices.

While coffee is grown in dozens of nations globally, most of the world's coffee beans originate from one of five nations: Brazil, Vietnam, Columbia, Indonesia, and Ethiopia.

All of these nations, with the exception of Vietnam, are permanent members of the United Nations. Vietnam was granted non-permanent member status in 2020-2021.

Unfortunately, these U.N. member nations have been plagued by government instability for decades. It may prove quite challenging to convince growers operating within these countries to adopt fair trade laws or sustainable farming practices. Grassroots farmers and workers receive little to no support from their governments.

Barriers to Global Regulation

The barriers to global regulation align with the challenges facing coffee growers at the individual level. Convincing leaders of these embroiled nations to invest in coffee industry sustainability efforts will prove difficult, if not impossible.

In the coming years, institutions such as the International Coffee Organization will be invaluable in implementing global regulation. Fair trade entities, government entities, and growers will need to work with the ICO to facilitate lasting change in the coffee industry.



Farm to Plate would like to thank **Karla Ferster**,
Owner Frog Friendly Wild Coffee



Impact of Consumer Demand Toward Sustainable Coffee

Often, the ability of a company to meet consumer demands for affordable goods is considered to be at odds with sustainability efforts. This perception exists because implementing fair trade practices and adopting sustainability strategies typically increases the cost of products.

In light of this fact, consumers must be willing to change their stance on purchasing commodities such as coffee. They must take a critical look at companies that purport to engage in sustainable business practices to ensure that they are supporting ethical organizations.

Some unscrupulous companies use flashy terms such as "most sustainable" without adopting sustainable growing practices.

Transforming the coffee market into a sustainable industry may require consumers to pay a few dollars more for a bag of coffee beans. This minor

adjustment can be life-changing for front-line workers in developing nations.

How Does Tracing Help Coffee Farmers?

Tracing coffee through the supply chain using blockchain can significantly aid farmers committed to sustainability. These farmers can determine precisely where their coffee beans are being delivered, which gives them more control over which partnerships they forge.

Additionally, blockchain tracing capabilities can be passed on to consumers. Farmers and coffee makers can incorporate a QR code onto their product packaging. Consumers can scan the code to learn more about where the product came from and its journey to arrive at their local grocery store.

In short, blockchain tracing will empower consumers to partner with brands that adhere to sustainability best practices. This strategy will allow ethical farmers to differentiate themselves from less-transparent competitors.

How BLOCKCHAIN TECHNOLOGY Can Aid Sustainability and Work Toward Solving Hunger



Blockchain technology has the potential to revolutionize the current food supply chain from the ground up. When applied to farming, fishing, and coffee growing, blockchain will substantially increase the efficacy of food tracing efforts.

This tracing will yield better transparency across the entire food supply chain while also empowering both farmers (the first link of the chain) and consumers (the last link of the chain).

Blockchain technology will provide farmers, consumers, and other concerned parties with an immutable record of food supply chain transactions. This record can hold growers, farmers, and distributors accountable while also improving overall food supply chain sustainability.

POTENTIAL BLOCKCHAIN IMPLEMENTATION BARRIERS



While the outlook for blockchain is positive, the farming, fishing, and coffee-growing industries must overcome several significant implementation barriers to realize the benefits of this emerging technology.

Most notably, these entities will need to overcome several organizational obstacles. They must improve collaboration with other entities involved in supply chain operations, such as governments, growers, distributors, shippers, etc. Adopting new organizational policies and industry guidelines can help alleviate this hurdle to blockchain adoption.

In addition to organizational hurdles, these industries must also navigate several technological barriers. Building out a user-friendly and fully-functional blockchain architecture is a massive undertaking. Loopholes and coding flaws can negatively impact the integrity of blockchain ledgers.

Fortunately, pluggable modules with multi-cloud integration capabilities can bridge the gap between food supply chain entities' current technological resources and those needed to implement blockchain food tracing protocols.

THE ROADMAP TO A 2030 DEPLOYMENT



If the fisheries, farmers, and coffee growers want to implement blockchain technologies by the U.N.'s 2030 deadline, they must work closely with other members of the food supply chain ecosystem.

Universal adoption across the entire chain is pivotal to the success of this endeavor. Distributors, growers, shippers, farmers, manufacturers, and other parties will need to collaborate more efficiently and implement new technological resources.

A key component to success will be consumer demand. When consumers expect to see traceability on their food and as part of the food supply chain, markets and stores will pass on that demand.

The food supply chain will bend in the direction of consumers.

While the entities outlined above will be invaluable to the implementation process, third-party blockchain food tracing service providers will be equally important.

Organizations such as Farm to Plate have crafted an innovative pay-per-use model that mirrors the Software-as-a-Service (SaaS) subscription plans that have become a staple of the modern corporate ecosystem.

This unique approach to blockchain food tracing offers an affordable solution for growers as they strive to become more sustainable and transparent.