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## PROMOTE SUSTAINABLE SUPPLY CHAIN OF VIETNAM AGRICULTURE SECTOR AFTER COVID-19 PANDEMIC

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### ABSTRACT

Sustainable development is an important and urgent issue for all economic sectors and other fields, including supply chain management of the agriculture industry. Along with the country's development, Vietnam's agriculture and rural areas are gradually changing, leading to increasing environmental pollution due to waste and chemicals from farming and livestock activities threatening sustainable development. Especially after the period of the COVID-19 epidemic, many difficulties and challenges have been created for the supply chain of agricultural products in Vietnam. After the impacts of the COVID-19 pandemic, it has become even more urgent to develop a sustainable supply chain in the agricultural sector. This study uses a literature review methodology to examine the publications with titles that are identical, the articles are sourced from digital databases on the websites of Google scholar, ResearchGate and other sources information. Descriptive methodologies are also employed from abstracts, introductions, and conclusions forms the basis for literature reviews, which are subsequently examined and summarized to provide recommendations in improving sustainability of agriculture supply chain, namely an assessment of existing experience and documents (database of research results). Since then, this article offers some solutions to enhance the sustainable development of businesses in this industry and to overcome disruptions in the supply chain after COVID.

**KEYWORDS:** Sustainability, supply chain, agriculture, environment, social, economic.

### 1. INTRODUCTION

The COVID-19 have endemic with its complicated and difficult-to-control developments has severely affected all global economies. The pandemic has exhausted the economies of many countries, reducing global trade, in which major economies such as the US, China, and Europe also wobbled because of the crisis. Vietnam is no exception, especially after the Covid epidemic, the supply chain was broken at many stages. So how to minimize risks to the supply chain and make it sustainable is one of the great challenges for Vietnamese businesses, especially those in the agricultural industry, one of the industries to meet the urgent and basic needs of the people. This is also an opportunity for businesses to develop in a more sustainable direction, towards community, environmental and social values. Therefore, Vietnamese agricultural businesses need to transform

their supply chain models to better suit the new situation, minimize the risk of supply chain disruptions, and build a sustainable supply chain to get future growth and long-term profitability.

## **2. RESEARCH OVERVIEW**

Sustainability has emerged as an important issue affecting businesses and society. The rapid growth of developing economies is placing pressure on the earth's natural resources. Stakeholders are increasingly putting pressure on companies to not only deliver economic benefits, but also deal with environmental and social issues, known as sustainability or social responsibility of business (Meixell and Luoma, 2015).

The term of supply chain management (SCM) was defined by Lambert et al. (1998) is “managing relationships in networks of organizations, from end customers through primary suppliers, using key multifunctional business processes to create value to customers and other stakeholders”.

Author Mentzer et al. (2001) defined supply chain management as “the systematic, strategic coordination of traditional business functions and tactics within business functions of a particular company and among businesses in a supply chain for the purpose of enhancing the long-term performance of individual companies and the supply chain as a whole”.

Sustainable supply chain management (SSCM) is derived from supply chain management, i.e., based on the application and extension of its concepts. There are many views, many different definitions of SSCM, but there is a consensus that the term SSCM refers to the integration of economic, social, and environmental practices into supply chain management. Carter and Roger (2008) define sustainable supply chain management as the strategic integration, transparency, and achievement of the organization's social, environmental, and economic goals in coordinating the system of inter-organizational business processes to improve the long-term economic performance of each member and its supply chain. The SSCM definition is based on three components and four aspects that support sustainability – risk management, transparency, strategy, and culture – conceptualized and shown in Figure 1.



**Figure 1: Sustainable supply chain management**

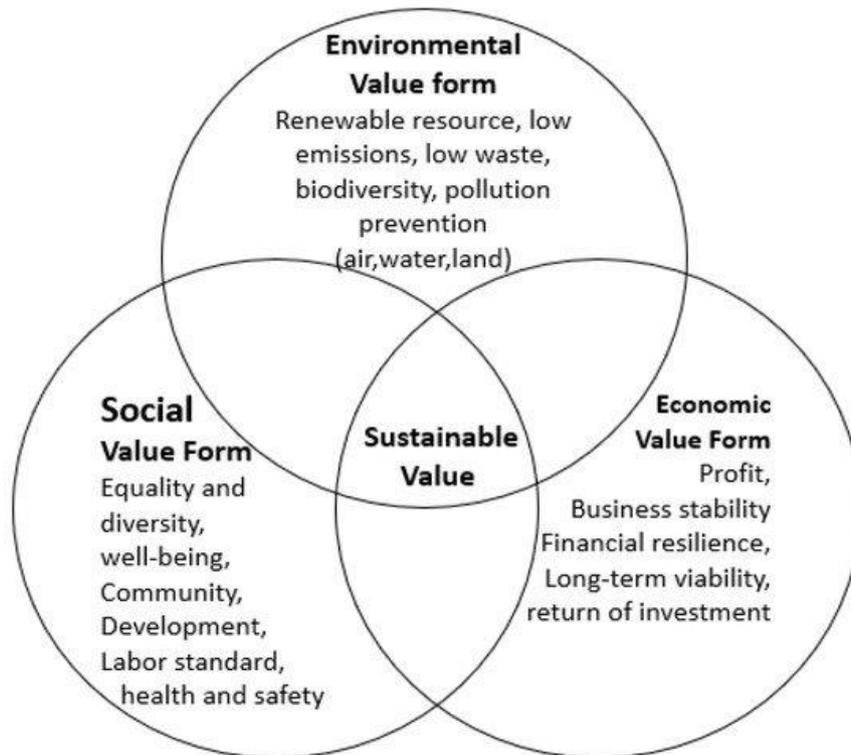
Source: Carter and Roger, 2008

Ahi (2014) defines sustainable supply chain management as: The creation of a coordinated supply chain through voluntary economic, environmental and social integration with main organizational business systems designed to effectively manage the resources, information, and capital flows involved in the procurement, production, and distribution of products or services to meet stakeholder requirements and improve competitiveness, and resilience of the organization in the short and long term (Ahi, 2014).

Besides, one of the cornerstones of sustainable supply chain management is the concept of Triple Bottom Line (TBL), which results from the sustainable development model and is based on finding a balance between the three factors: economics, ecology, and ethics (Reichel and Oczyp, 2011). TBL together with sustainable development and corporate social responsibility is the combination of 3 factors: people, planet, and profit.

The concept of Triple Bottom Line (TBL) was coined in 1994 and used in 1997 by John Elkington (Elkington, 1997). Before the 1990s, this term was not well known. The three bottom factors also

known as Triple Bottom Line (TBL or 3BL) is a framework with three components: economics, society, and environment (or ecology).



**Figure 2: Triple Bottom Line Model**

Source: Elkington, 1997

TBL theory is used to test and reflect the efficiency of enterprises in 3 factors: economic, environmental, and social issues. At that time, understood in a narrow sense, TBL is an analytical framework for accounting to measure and report on business activities in all three aspects: economic, social, and environmental elements to encourage organizations to incorporate sustainability into their business practices (Elkington, 1997).

When an enterprise meets equally three factors: economic, social, and environmental development, it is considered as sustainable development (Hart et al., 2003). Accordingly, businesses must ensure economic profits, while reinforcing social benefits and sustainable environmental protection in the supply chain.

Chardine-Baumann and Botta-Genoulaz (2011) provide an economic, environmental, and social assessment framework in the supply chain and propose a model for “global” performance, combining three interrelated activities are economic, social, and environmental factors in the supply chain. The

study results suggested a model for describing overall performance, built around three dimensions, five issues in each dimension presented in Table 1 as follows:

**Table 1: Economic, environmental, and social assessment framework in the supply chain**

Economic	Social	Environmental
<ul style="list-style-type: none"><li>▪ Reliability</li><li>▪ Responsiveness</li><li>▪ Flexibility</li><li>▪ Financial performance</li><li>▪ Quality</li></ul>	<ul style="list-style-type: none"><li>▪ Work conditions</li><li>▪ Human rights</li><li>▪ Societal commitment</li><li>▪ Customer issues</li><li>▪ Business practices</li></ul>	<ul style="list-style-type: none"><li>▪ Environmental management</li><li>▪ Use of resources</li><li>▪ Pollution</li><li>▪ Dangerousness</li><li>▪ Natural environment</li></ul>

Source: Chardine-Baumann and Botta-Genoulaz (2011)

The literature review shows that at the intersections of economic, social, and environmental activities, there are activities in which organizations participate that not only have a positive impact on the natural environment and society but also bring long-term economic benefits and competitive advantages to the organizations (Rogers and Carter, 2008). Closs et al. (2011) observed that good practices in the three economic, social, and environmental pillars ultimately lead to increased profitability and efficiency in the long run. De Brito and Laan (2010) show that combining economic, social, and environmental activities with traditional goals can add value to businesses and provide competitive advantages.

Based on this theory, there are currently some practical studies on sustainable supply chains in Vietnam but very few. Some of these studies include:

Le Bao Toan and Bui Van Trinh (2021) have researched “Sustainability and competitive advantage in the agricultural product chain”. This study only synthesizes theories related to the sustainability of the agricultural supply chain and has not yet proposed specific solutions that are applicable for a sustainable supply chain in Vietnam.

Duong Ngoc Hong (2021) has researched on "Sustainable development in the supply chain in Vietnam during the COVID-19 period". The study has proposed several recommendations and solutions, including Developing e-commerce, conscious business, applying technology in distribution and some recommendations for policies and resolutions from the Government. However, this study has not

proposed more comprehensive solutions to build a sustainable supply chain and does not specifically address the supply chain of the agriculture industry.

### **3. RESEARCH METHODOLOGY**

In this study, the author uses theoretical research methods, theoretical analysis and synthesis methods, and qualitative research methods and historical methods.

Theoretical research method is mainly used to collect information through the publications with titles that are identical, the articles are sourced from digital databases on the websites of Google scholar, ResearchGate and other sources related to sustainable supply chains providing readers with definitions and concepts to understand the nature of sustainable supply chain.

The method of theoretical analysis and synthesis is employed in this work to analyze the recent data information and scientific assessments from published articles and research regarding to current situation of sustainable agriculture supply chain in Vietnam. From there, the author synthesizes and discovers general situations and characteristics of the sustainable supply chain of agriculture.

The historical method used in this research to help viewers understand the process of its formation and development of sustainable supply chain. Through the process of transformation and the nature of sustainable supply chain will be more easily recognized.

Qualitative research method is utilized to format and summarize research results of agriculture supply chain in Vietnam base on collected information that are not measured by specific indicators and units. This method helps researchers to gain a deeper understanding of real situation of agriculture supply chain in Vietnam.

## **4. REALITY OF THE SUPPLY CHAIN OF AGRICULTURE IN VIETNAM**

### **4.1. The real situation of agriculture in Vietnam**

According to the socio-economic report of the General Statistics Office, in 2022, GDP increased by 8.02%. In the total added value increase of the entire economy, the agriculture, forestry, and fishery sectors increased by 3.36%, contributing 5.11%. In which, the agricultural sector increased by 2.88%, contributing 0.27 % to the growth rate of the total added value of the entire economy. In the agriculture, forestry and fishery sector, agriculture is still a stable growing industry. The output of some perennial crops and the output of some major livestock products increased positively compared to the same period last year as shown in the table below.

**Table 2: Value of products obtained per 1 hectare of arable land and aquaculture water surface.**

	Arable land	Aquaculture water surface
Value (Million dong)		
2020	102,70	237,30
2021	105,18	245,77
2022	106,40	254,70
Development index (Previous year = 100) (%)		
2020	104,90	101,71
2021	102,41	103,57
2022	101,16	103,63

Resource: General Statistics Office in 2022

Vietnam is a dynamic market with a population of more than 95 million people, most of whom are of working age, so the demand for food is very large. However, a notable situation is that consumers have lost confidence in Vietnamese agricultural products due to the problem of dirty, unsafe, and unhygienic food leading to the need to use safe food of people across the country is becoming increasingly urgent. In addition, the production and distribution of agricultural products in general and agricultural products in particular in Vietnam still have "bottlenecks" that have not been resolved on a large scale. One of the weakest points is that the current food supply stage still mainly follows the traditional model with many layers and intermediate stages, leaving consumers without direct interaction with agricultural producers (farming households).

In fact, about 80% of Vietnamese consumers are willing to pay more to buy products with environmentally friendly ingredients and "green" and "clean" brands. Brands that produce cleanly and commit to providing "green, clean" products have a growth rate four times higher than businesses in

the same industry. Corporate sustainability makes employees motivated to work and work more effectively because they feel valued and proud of the business. Enterprises that implement sustainable policies will create competitive advantages, increase labor productivity through connections with employees, and help businesses meet increasingly stringent customer requirements. According to Forbes Magazine (USA), consumers often prioritize choosing businesses that are responsible to the environment and society. Consumer awareness and preference for and interest in sustainable businesses are increasing. The benefits and transparency that sustainable supply chains bring to businesses will create a better competitive advantage in the difficult times of the current economy. (Pham Thi Thanh Binh, 2023)

Vietnam's agricultural supply chain has a small, unfocused farming scale, making the application of science and technology very difficult from breeding, caring, treatment... leading to low productivity and consuming a lot of resources but the output is still unequal. At the same time, this also makes associations between members in the supply chain very difficult. Agricultural products are not well organized and the connection between entities in the supply chain is not tight, making it vulnerable to extraordinary developments. In addition, the laxity in the supply chain of agricultural products makes members only care about their own work and benefits without considering broadly the overall benefits of the entire supply chain. Production and processing units are often in the position of managing the chain, but there is still the phenomenon of price pressure during the main season, or the sudden stopping of purchasing by traders, causing them to suffer losses.

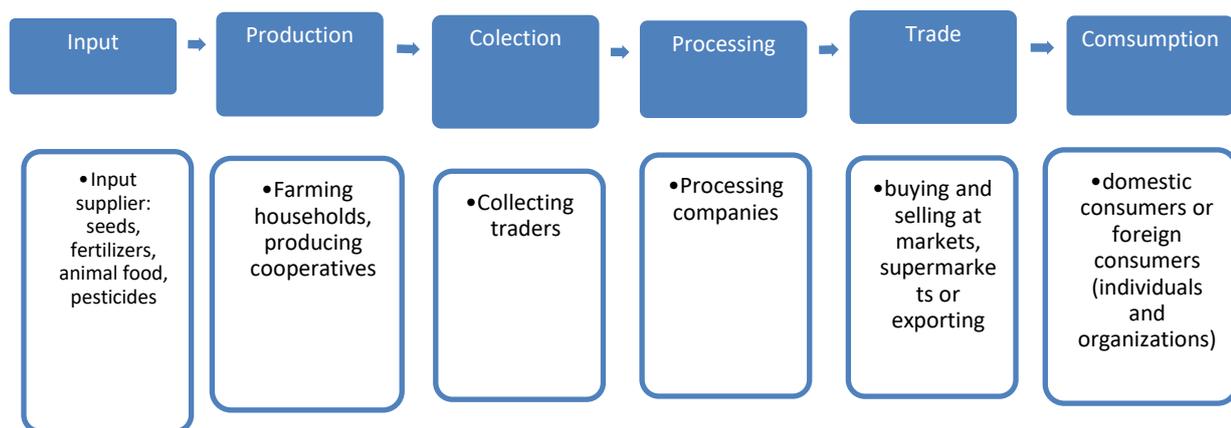
An outstanding problem is that many members in the supply chain are small and medium-sized enterprises, so most Vietnamese agricultural enterprises are lacking capital. Meanwhile, the burden of costs related to administrative procedures and transportation, combined with risks due to weather fluctuations, dependence on the economy and the environment, and a weak product communication network system... makes businesses in this industry always face a lot of pressure. Many businesses have not invested in modernizing supply chain management in general and information technology applications internally in particular as well as linking with external partners, and have not been equipped with optimal software systems to optimize supply management, distribution management, marketing management, sales data management...

Agricultural enterprises have not focused on building strong brands, which is also the main reason why the value of many agricultural products in our country is still low when participating in the global agricultural supply chain.

According to Le Vu Toan, Nguyen Thi Thu Thuy (2020) approaching the development of Vietnam's agricultural industry from the perspective of the supply chain and from agricultural producers, traders, industrial manufacturers, distributors to final consumers. The supply chain in the production and trading of agricultural products is understood as the network used to transfer products and services

from raw materials to end customers through structuring the flow of information, distribution and money that is described as a diagram in Figure 3.

**Figure 3. Typical Vietnamese agricultural product supply chain**



**Resource: Le Vu Toan, Nguyen Thi Thu Thuy (2020)**

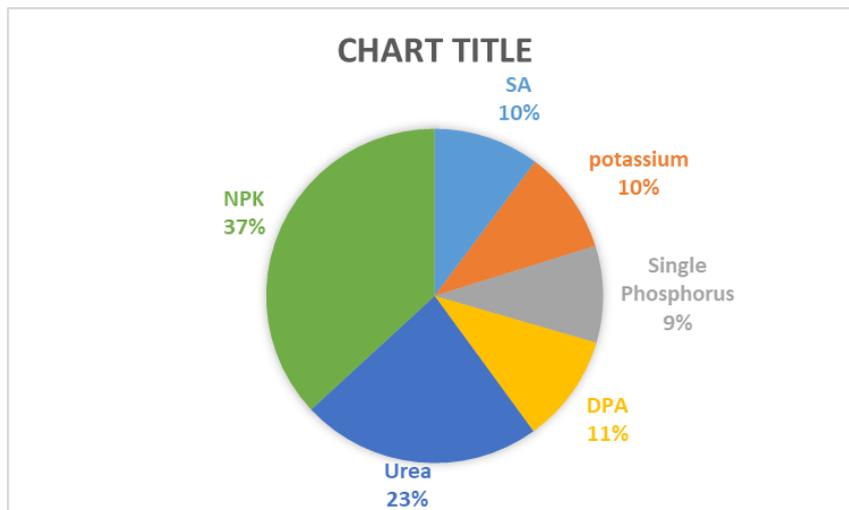
Vietnam’s agricultural supply chain is much more diverse and complex, detailed by each product or product group, including activities related to the chain of service providers from seeds, supply of materials, transportation, customs... However, for many years there has been a situation of rescuing agricultural products in main season and increasing prices of agricultural products while the income of producers is still facing many difficulties and it seems that the benefits of the agricultural value chain do not put in agricultural producers.

To develop a sustainable supply chain, in addition to economic issues, businesses need to pay attention to social and environmental responsibility. In the National Strategy on Green Growth for the period 2021-2030, vision 2050, it is forecast that the GDP growth of the agricultural sector will reach 2.5 - 3% per year. In particular, the proportion of organic fertilizer products in the total fertilizer products produced and consumed reached over 30%. The government also plans to increase the number of biological pesticides by over 30%. At the same time, at least 30% of the total area of upland crops is applied with advanced water-saving irrigation methods.

Although results have been achieved in protecting the agricultural and rural environment, environmental pollution in some areas still tends to increase: Using unsafe fertilizers is having a significant impact on the crops and environment. On average, the total amount of inorganic fertilizer used is about 2.4 million tons/year, each year about 240 tons of packaging and cans are released into the environment, most of which is not collected. The use of pesticides tends to increase and is

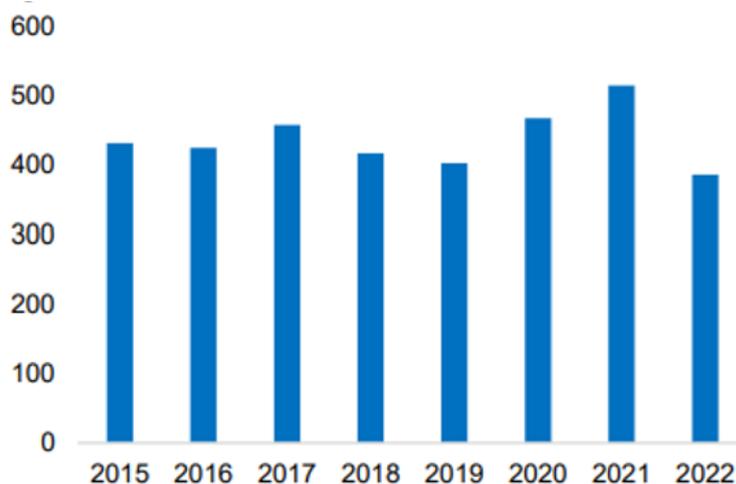
uncontrolled. According to statistics from the Plant Protection Department, each year Vietnam imports about 70 to more than 116 thousand tons of plant protection chemicals; In which the amount of packaging accounting for about 10% of the total amount of consumed drugs is not collected, negatively affecting the ecosystem, and posing a threat to public health. (Nguyen Thi Bich Ngoc and Bui Quoc Luan, 2018).

**Figure 4: Consumption structure by type of fertilizer**



Resource: According to statistics of FAO

According to statistics from FAO - Food and Agriculture Organization of the United Nations: Chemical fertilizers determine 50% of the total increase in agricultural products. In Vietnam, on average, chemical fertilizers increase the total amount of agricultural products by 35%.



Resource: GSO, Tilasto.com

Chemical fertilizers are used in large amounts each year and are indispensable for farmers to increase crop yields. This is an alarming problem for the environment when chemical fertilizers are being overused in production.

In Vietnam, every year our country's agricultural production releases CO<sub>2</sub> emissions equivalent to about 80 million tons into the environment, emissions from agricultural production activities account for 25-30% of total emissions and half of that comes from rice production activities. In agriculture, 75% of total emissions are Methane (CH<sub>4</sub>), of which 75% is from rice production. The Department of Crop Production said that efforts to reduce emissions from rice production are facing many obstacles such as: localities still focus mainly on economic goals and food security, do not pay attention to emissions reduction; lack of mechanisms to promote farmers to produce low-emission rice; The cost of rice production using low-carbon farming processes is still high; Post-harvest losses are still high (over 10%)... Faced with the above situation, the need to transform the rice value chain to cope with climate change and reduce emissions is considered necessary in implementing the climate change adaptation goals in Vietnam. (Tuyet Mai, 2022).

As a developing country that has just started the process of industrialization over the past three decades and is severely affected by climate change and despite many difficulties in terms of resources, Viet Nam has always proven itself responsible and has proactively implemented international commitments on climate change.

**Table 3: Comparing NDC 2020 and NDC 2022 emission reduction targets.**

Sector	Unconditional contribution				Conditional contribution			
	NDC 2020		NDC 2022		NDC 2020		NDC 2022	
	(%)	(Million tCO <sub>2</sub> eq)	(%)	(Million tCO <sub>2</sub> eq)	(%)	(Million tCO <sub>2</sub> eq)	(%)	(Million tCO <sub>2</sub> eq)
Energy	5,5	51,5	7,0	64,8	16,7	155,8	24,4	227,0
Agriculture	0,7	6,8	1,3	12,4	3,5	32,6	5,5	50,9
LULUCF*	1,0	9,3	3,5	32,5	2,3	21,2	5,0	46,6
Waste	1,0	9,1	1,0	8,7	3,6	33,1	3,2	29,4
IP	0,8	7,2	3,0	27,9	0,9	8,0	5,4	49,8
<b>Total</b>	<b>9,0</b>	<b>15,8</b>	<b>15,8</b>	<b>146,3</b>	<b>27,0</b>	<b>250,8</b>	<b>43,5</b>	<b>403,7</b>

Note (\*): increases greenhouse gas absorption.

Resource: Vietnam's Nationally Determined Contributions updated to 2022

At COP26, Viet Nam stated that it “will develop and implement strong greenhouse gas emission reduction measures with its own resources along with the cooperation and support of the international

community, especially developed countries, both in terms of finance and technology transfer, including implementing mechanisms under the Paris Agreement, to achieve net zero emissions by 2050". From that point of view, developing a sustainable supply chain is one of the most efficient solutions to reduce environment pollution and gas emissions.

**Table 4. Greenhouse gas emissions for 2020 and estimated 2030**

Unit: Million tons of CO2 equivalent

Sector	2020	2023
Energy	381,1	648,5
Agriculture	100,8	109,3
LULUCF*	-42,5	-45,3
Waste	26,6	48,0
<b>Total</b>	<b>466,0</b>	<b>760,5</b>

Resource: Banh Thi Hong Lan (2020)

The main sources of emissions include: CH<sub>4</sub> and N<sub>2</sub>O emissions from livestock, rice cultivation, agricultural land, and burning activities in agricultural production; CO<sub>2</sub> emission/absorption in the fields of agriculture, forestry, and land use change. Overall, the AFOLU (Agriculture, forestry, and land use) sector contributes about 30% of global GHG emissions, mainly due to CO<sub>2</sub> emissions from changes in land use (largely due to tropical deforestation) and CH<sub>4</sub> and N<sub>2</sub>O from farming and livestock farming.

Agriculture accounts for only 16% of the GDP structure, but labor accounts for over 42%. People in rural areas account for 70% of the population. Labor structure is a big problem for the agricultural industry. According to a report by the Vietnam Institute for Economic and Policy Research (VEPR), the value of Vietnam's aggregate labor productivity tends to increase at a rapid rate over the years. Average labor productivity increased from 38.64 million VND/worker/year in 2006 to 60.73 million VND/worker/year in 2017. However, the agriculture, forestry and fishery sectors are still among the sectors with the lowest labor productivity levels in the economy. Agricultural labor also contains many risks to human health such as: poisoning with plant protection chemicals, injuries from sharp objects (farm tools, broken bottles, etc.), electric shock from unsafe electrical equipment, etc.

As can be seen, Vietnam has nearly 16 million rural households, but agricultural labor productivity is very low. Specifically, the farming industry only reached 204,000 VND/day, livestock 228,000 VND and aquaculture 275,000 VND/day. According to ADB's "Asia Development Outlook 2017" report,

the average agricultural output per worker in Vietnam is only 1/3 of Indonesia's, less than half that of Thailand and the Philippines.

**Table 5: Social labor productivity by economic sector**

Unit: Million dong/person/year

Economic sector	2020	2021	2022
Agriculture, forestry, and fishery	57,44	74,68	81,07
Manufacturing and processing industry	170,44	186,23	200,16
Construction	102,72	111,35	127,10
Transportation, warehousing	196,66	203,52	232,04
Education and training	153,96	174,85	188,17

Source: General Statistics Office 2022

Besides, rural human resources are not of high quality but are still competed strongly by other regions. Urbanization has attracted young, healthy human resources from rural areas to urban areas, leading to a situation where workers staying in rural areas are mainly people above or below working age, who are not healthy or are going to school. This deepens the gaps in human resources in rural areas and others, which are already weak in quality.

Currently, Vietnam is lacking highly qualified labor and professional skills to meet high-tech agriculture in the 4.0 period. In the current context of deep international integration and with 70% of the population still relying on agricultural production, improving the quality of human resources for rural areas is an urgent requirement.

The above issues show that the agricultural supply chain in Vietnam still faces many difficulties in the process towards sustainable development, and the social and environmental responsibilities of businesses still have many issues to be resolved. The table below shows the inadequacies in the supply chain of Vietnamese agricultural production.

**Table 6: Inadequate Points in stages of agricultural supply chain in Vietnam**

No.	Stages in the supply chain	Inadequate Points
1	Manufacturing	<ul style="list-style-type: none"> <li>• Small, unfocused farming scale</li> <li>• Large loss rate</li> <li>• Lacking capital.</li> <li>• Difficulty in applying for new scientific technology</li> <li>• Pesticide residues and Residues of growth stimulants are used in large amounts</li> <li>• Lots of emissions from agricultural production</li> <li>• Lacking highly qualified labor and professional skills</li> <li>• Low productivity and output is still unequal</li> </ul>
2	Processing and packaging after harvest	<ul style="list-style-type: none"> <li>• Lack of post-harvest treatment facilities</li> <li>• Conditions are not met high-value export channel</li> <li>• Cross-contamination of pesticides</li> <li>• Not clear about rules of origin</li> <li>• Large amount of packaging and cans are released into the environment</li> <li>• Lack of the role of state management agencies (quality inspection, production, and business)</li> </ul>
3	Collection	<ul style="list-style-type: none"> <li>• Traders make price pressure in the main season</li> <li>• Lack of consistency and synchronization with regulations</li> <li>• The link between producers and businesses is weak and lacking</li> </ul>
4	Distribution	<ul style="list-style-type: none"> <li>• Don't pay attention to self-certification of origin: capacity, process, responsibility, procedures related to tax, banking, ...</li> <li>• Not focused on building strong brands</li> <li>• Poor competitiveness</li> <li>• Loading and unloading technology is still very rudimentary, unable to access large vehicles.</li> <li>• The rural road system has not been properly invested and developed</li> </ul>

Resource: The author synthesized from other studies

The above situations show that the inefficient labor situation and environmental pollution from agricultural production and processing activities of enterprises and cooperatives in the supply chain have reached alarming levels. It demonstrates the responsibility of businesses for sustainable development of agricultural and food production and of agricultural supply chains in general that requires synchronous solutions and the efforts of many parties.

## 5. SOLUTIONS

Facing the current situation of the supply chains of Vietnam's agricultural industry, to develop a sustainable supply chain, some necessary solutions are as follows:

### **5.1. Applying green technology to a sustainable supply chain to minimize the harmful effects of environmental pollution and increase its the social responsibility.**

Applying digital technology towards environmental protection and social responsibility in the supply chain is an increasingly popular trend in the modern world. Digital technology brings significant benefits in reducing the negative impact on the environment in the production, transportation, storage, and distribution processes of goods. Digital technology allows businesses to accurately track and manage the number of raw materials used, each step of production as well as transportation performance. Thanks to that, they can reduce the amount of waste and polluting emissions into the environment. Additionally, digital technology provides smart solutions to optimize goods storage and distribution processes. Intelligent automated systems can manage inventory, minimize waste, and maximize storage space utilization. This helps reduce energy and resource consumption.

The supply chain can use 4.0 technology to build a software system to collect information and data on production, processing, and consumption of agricultural products (area, output, processing capacity, demand, price, volume, consumption structure of products, supplies, input materials...); Applying remote sensing technology to collect data and statistics on area and output for crop and forestry industries; Apply digital technology in conducting investigations, collecting information and data. Besides, build and integrate features, statistical algorithms, and econometric models for calculation, analysis and forecasting; Applying artificial intelligence (AI) technology and Big data in forecasting fluctuations in supply, demand, prices of agricultural supplies and products; Classify and provide appropriate analysis and forecast information to users, in accordance with the law; Applying digital, multi-platform technology in providing and transmitting information, ensuring uniform, accurate and timely requirements.

Integrating digital technology in the supply chain also ensures transparency and compliance with regulations on environmental protection and social responsibility. Environmentally relevant data is publicly accessible, helping communities and monitoring agencies evaluate and promote regulatory compliance. This will be an important progress to improve economic efficiency, protect the environment, and actively contribute to preserving natural resources for future generations, contributing to improving sustainability in the supply chain.

### **5.2. Enhance Integrated supply chain and strategic collaboration.**

In today's competitive market, most companies have no choice; without close integration, their business activities will be difficult to sustain. Therefore, to adapt to new markets and situations, businesses are forced to link, integrate their supply chains, and engage in strategic collaboration. Building a strategic partnership in the supply chain is necessary because the member businesses of the

supply chain are always dependent on each other. If the supply chain is broken, it means that the enterprises in the chain are at risk of bankruptcy.

This pressure comes from both customers and supply chain partners. Therefore, businesses need to determine how much collaboration affects their success, what information can be shared during collaboration, as well as the appropriate level of integration and type of collaboration for each specific situation and project. For the supply chain to be flexible and respond dynamically to market disruptions, it is necessary to integrate its supply chain and create linkages and strategic collaboration to the supply chain.

When a business and a supplier work in harmonious way, they find that coordination leads to good results for both parties. At that time, they will look for a long-term relationship to protect the interests of both parties. With strategic partnerships, suppliers know their business will continue in the long run and can invest in improving their products as well as their business operations. At the same time, if businesses have suppliers that guarantee long-term and continuously improve, they will confidently invest in their operations and find ways to strengthen strategic partnerships. The parties will be more beneficial when sticking to long-term cooperation with each other in a strategic partnership.

### **5.3. Transparency of the supply chain and product origin**

According to the Transparency Food Association, many businesses have aimed to produce food that meets VietGAP, GlobalGAP, ASC, HACCP standards, etc., but that is still not strict enough for quality standards. Consumers need more transparency about the process and product origin, which means they need traceability information at all stages in the production and consumption chain. They want to know if the product supplier is making the best effort in terms of product quality assurance; the product is under strict quality control throughout the supply chain.

The current trend is to use information technology and electronic devices to facilitate information updating, data management and product traceability. With this solution, manufacturing enterprises put information on the system from the first stages of the production chain to product packaging. All product information is stored on the server, easy to retrieve, and the buyer can see the shipment information on the system even before the shipment has left the place of production. Product origin can be quickly traced via QR code (QR code: 2-dimensional barcode or quick response code, matrix barcode) printed on product packaging by using a code scanning application on smartphones.

This solution is especially important in food safety. In many developed countries, traceability is an important and mandatory element for many types of products, in which the most interesting are still food items. So today for businesses, retrieving product information is the first step to creating trust with customers, expressing goodwill to transparent all necessary information. For consumers, traceability is an effective and quick solution to check product quality to ensure genuine and safe purchases. Therefore, towards a sustainable supply chain, information transparency of the production

process cannot be ignored. This is a factor that helps improve consumer confidence and meet international requirements, ensuring a more sustainable supply chain.

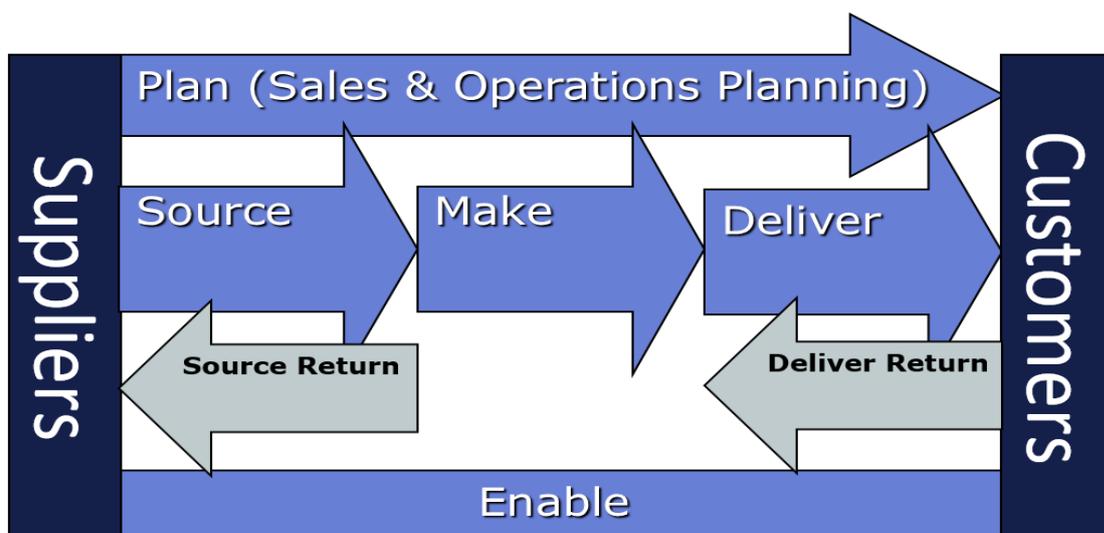
#### 5.4. Building a sustainable, efficient, and environmentally friendly supply chain model

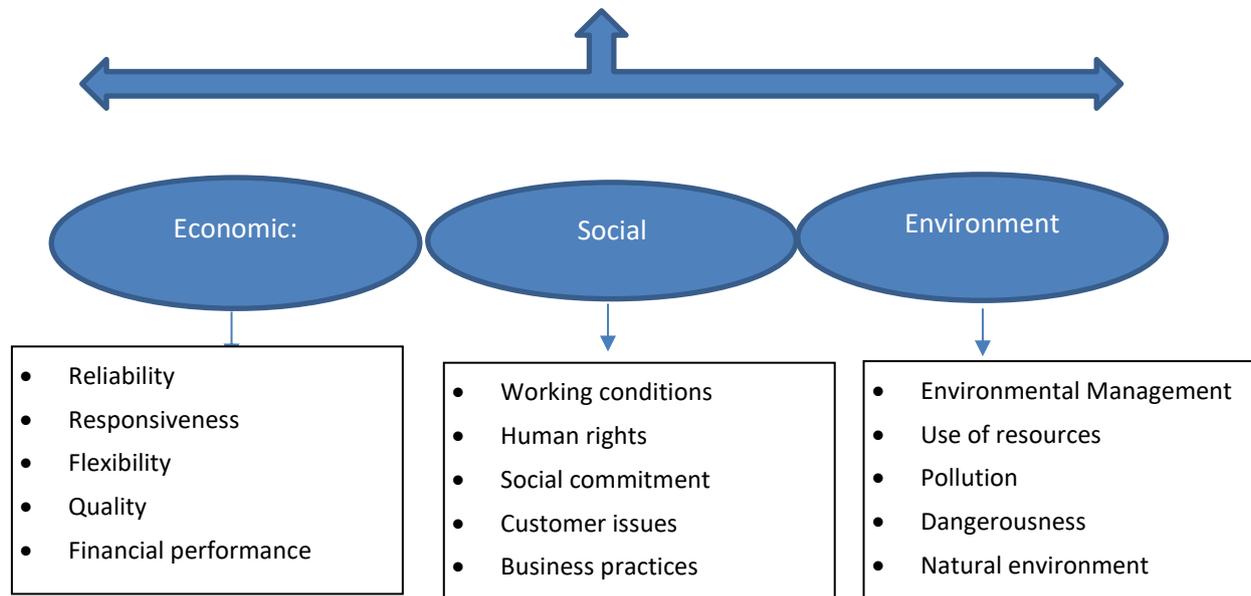
According to the Global Supply Chain Council, a non-profit organization dedicated to providing standard methods and tools to help companies build and develop supply chains, the supply chain standard model is supplying chain operation reference model (SCOR). SCOR is a closed supply chain model, with close linkage in the entire production process through regular information exchange between actors in the supply chain at all stages: Planning; Exploiting raw materials for production; Manufacturing products; Product distribution; Recalling Products; Recovery of recycled materials.

Stemming from the above model, to build a sustainable supply chain, the author proposes a sustainable supply chain model SCOR that is environmentally friendly and creates positive social impacts, hereinafter called the sustainable SCOR model (S-SCOR).

S-SCOR management is the integration of environmental and social factors into supply chain management, including sustainability planning, sustainable resource management, creating sustainable production and distribution processes through cleaner and more energy-efficient production operations to bring the final product to the consumer and manage the product's end-of-life after its use, also known as recycling. S-SCOR management involves traditional supply chain management practices that integrate environmental and social standards and long-term relationships with suppliers. The specific model is as follows:

Figure 6. Sustainable Supply Chain Operations Reference Model (S-SCOR)





Source: Global Supply Chain Council

### **Sustainability planning**

In the planning stage, businesses need to start from designing environmentally friendly products, calculating environmental costs, analyzing the environmental life cycle, and planning to organize the implementation to meet the social requirements.

### **Sustainable resource management**

Exploiting and using resources efficiently is a key content of businesses today to ensure safety for human health, environmental friendliness, and stable supply. Agricultural enterprises need to move towards a material cycle plan to solve the problems of resource depletion and environmental pollution. The goal is to maximize the value of using resources and minimize waste and emissions and excess amounts of pesticides and fertilizers to make the environment greener, cleaner, and healthier.

### **Energy-saving and cleaner production operation process**

One of the dilemmas for agricultural businesses today is energy saving and environmental impact control. Therefore, enterprises need to have a strategy to improve production processes to save energy, reduce carbon emissions and reduce environmental pollution, take advantage of recycled and re-processed products to improve efficiency, environmental management, and social impacts.

### **Sustainable product distribution**

For distribution, the focus is on low-carbon transport and encouraging cooperation among distributors to improve efficiency. Businesses need to promote improvements or change forms of transport that

uses less energy and has less emissions. Transports that generate low emissions such as electric vehicles, clean energy vehicles, etc. are encouraged to use.

Packaging and labels that are recyclable, reusable, or decomposable are also current consumption trends. Businesses need to increase reuse of products, packaging, and materials; remanufacturing while ensuring environmental safety and hygiene and creating a good impact on society.

In the field of logistics, businesses need to apply information technology to effectively manage product quality during transportation and delivery. Reducing transportation time and delivery time and shortening waiting time for goods is one of the important criteria for consumers to evaluate product service quality.

This model can effectively solve environmental and social issues in the agricultural supply chain, help businesses use energy and natural resources efficiently, save costs, reduce environmental pollution, and protect the environment and community health. The model also uses economic, social, and environmental assessment frameworks in the supply chain of Chardine-Baumann and Botta-Genoulaz (2011). This assessment framework allows to examine activities in the S-SCOR model whereby, from supplying, producing, distribution to product recycling, all are evaluated on 3 aspects: environment, society and economy. From there, businesses can complete a sustainable supply chain at all stages and across all activities of members participating in the chain.

**Environmental issue:**

Supply chain managers need to find measures to minimize negative impacts on the environment from production and business activities of the company. In supply, production and distribution activities, managers need to assess environmental impacts on the following aspects: environmental management; use of resources; pollution; dangerousness and natural environment.

Environmental factors are considered in stages from raw material selection, process innovation to alternative product delivery methods or product disposal at the end of their life cycle. The overarching goal for operations managers is to conserve natural resources, reduce greenhouse gas emissions, convert to less polluting modes of transport, etc., thereby reducing impacts. negative impact on the environment.

**Social issue:**

Businesses are becoming more aware that their business decisions. Their business decisions have a wide impact on people. Not only their employees and customers, but also those who live in the communities in which they operate. The social evaluation criteria for the supply chain are working conditions; human rights; social commitment; customer issues; business practices.

Customers increasingly want to know if the products they buy are safe and are produced responsibly, and whether businesses are committed to society. Therefore, businesses need to pay attention to working conditions, paying fair wages, and providing a safe and healthy workplace. Even the selection of suppliers is not only based on price and quality but also needs to be assessed the criteria for the safety of the working environment, the minimum wage to ensure a life for the workers, the appropriate labor intensity of the workers, as well as a commitment not to use child labor in chain members.

**Economic issue:**

Social and environmental sustainability would not exist without economic sustainability. Cost savings and long-term profitability are among the most important factors for achieving the goal of adding value and ensuring economic sustainability in the supply chain. Economics is assessed through the following criteria: reliability; responsiveness; flexibility; quality; financial performance.

In the S-SCOR model, cost savings can be achieved throughout the entire chain by detecting and reducing waste in material usage, production costs, excess inventory and all operations that do not bring added value at all stages in the chain. In the process of building and developing a sustainable supply chain, the efficiency and performance of the chain is sustainably improved by the active interaction between members, by the tighter integration process, and higher transparency throughout the chain and positive effects from customers and society.

**5.5. Managing risks in the supply chain for sustainable development**

The Covid pandemic has shown that risks in the supply chain can happen at any time, since minimizing risks in the supply chain is also one of the issues that supply chain managers are very concerned about. To limit the risks of supply chain disruptions, according to Tran Van Hoe (2018), there are the following strategies can be implemented:

**Supply chain shortening strategy.**

Supply chain shortening strategy is a strategy to centralize certain activities in a few regions or at domestic enterprises instead of dispersing operations in many other places or countries. The short supply chain of agricultural products can be simply understood as the minimization of participants in the supply chain with the main characteristics measured by geographic distance, the gap between producers and consumers; number of intermediaries participating in the supply chain; connection and interaction between consumers and producers.

Localizing production and shortening its supply chain is necessary to reduce the risk of trade disruption. To do this, agricultural businesses need to form “Vietnamese pure link chains” in which members join and collaborate strategically to meet regulations and standards in accordance with international practices. Thus, it is possible to reduce the risk of supply chain disruption during the epidemic period as well as if other events occur.

**Fence building strategy**

Fence strategy is based on mutual reciprocity between members in the supply chain. Accordingly, any loss to any member of the supply chain will be offset by gains achieved in other members of the supply chain. For example, in the pork supply chain, businesses invest in many pig farms across the country. If one farm is not successful due to an epidemic or natural disaster will be offset by profits on other farms. Success and failure throughout the chain will offset to ensure the goal and efficiency of the entire supply chain.

**Flexible strategy**

A flexible strategy allows businesses to take advantage of chain members' ability to quickly switch, easily change production and distribution locations. Flexible supply chains are suitable if designed with multiple suppliers with full production capacity in different regions. Products can be quickly changed according to market requirements or can be supplied quickly, shipped at minimal cost from one region to another according to specific market conditions.

**5.6. Building brand value and competitive advantage**

A sustainable supply chain directly affects a brand's reputation. Brands can increase the value of a business and attract consumers and other relevant parties. Undeniably, a business with a sustainable supply chain will build solid trust with partners and potential investors. In the context of increasing attention to sustainable values, many investors are often not interested in businesses that do not promote community goals. Possessing sustainable policies helps businesses avoid reputational risks, while minimizing the risk of stock value decline.

**6. CONCLUSION**

After the Covid 19 pandemic, supply chain managers realize the fragility of modern supply chains and must reconsider their supply chains. With the current trend of modern technology development, Vietnamese businesses in general and agricultural businesses in particular should care about the sustainable development of their supply chain to keep up with new trends and deal with possible risks that can happen at any time.

It can be said that the trend of sustainable production and consumption has been receiving great consensus in the community, from businesses, production units, product suppliers to consumers. Not only that, but consumers also have the move to turn away, boycott the use of products of businesses that pollute the environment or have bad social impacts when businesses are denounced by people or by the authorities.

Therefore, solutions to promote sustainable supply chains are essential for businesses, especially in the agriculture industry. Therefore, businesses see the importance of collaborating with each other to build a sustainable supply chain model that meets the needs of customers, society and the businesses themselves.

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