

## Sustainable Agriculture Development, Acceptable to Climate Change, Digital Transformation on Mekong Delta, Vietnam

By

**Dr. Nguyen Viet Thanh**

Vinh Long University of Technology Education, Vietnam Email: [thanhnv@vlute.edu.vn](mailto:thanhnv@vlute.edu.vn)

**Dr. Nguyen Giac Tri**

Dong Thap University, Vietnam \*Corresponding Author Email: [ngtri@dthu.edu.vn](mailto:ngtri@dthu.edu.vn)

### Abstract

Issues of food security, climate change, and environmental pollution are the most extensive formulas of change for people and humanity, not only in the 21st century but this issue is not being realized. The timely resolution will have a significant impact in the future. The Mekong Delta of Vietnam is a coastal lowland area, an area that is and will be heavily affected by environmental pollution, climate change, and epidemics, which significantly affect industrial development services in this area. The first article studies the development of green, clean, sustainable agriculture, adapting to climate change, and actively digital transformation of agriculture in the Mekong Delta is an inevitable trend of customers, is the "key", is the foundation for development based on agriculture in the Mekong Delta, contributing to realizing the goal of rich people, strong country, democracy, justice, and civilization.

**Keywords:** Sustainable, green agricultural development, digital agricultural transformation, climate change, Mekong Delta, Vietnam.

### Introduction

Developing green, clean, sustainable, environmentally friendly agriculture, adapting to climate change, and ensuring food security is a global issues. For Vietnam, environmental pollution, climate change, and unfriendly production have a great influence on the development of green and sustainable agriculture. Therefore, the development of green, clean, sustainable, environmentally friendly agriculture, adaptation to climate change, and food security is a major policy of the Party and State with an extremely important role.

Human history unfolds like an endless flow that each of the following socio-economic forms always inherits and selects the positive and progressive values of the previous socio-economic forms, filtering out those that are outdated, outdated, and no longer suitable to develop to a new higher level of quality. The development of each socio-economic form towards more and more perfection is an inevitable law. The development of manufacturing in the past decades has consumed a huge amount of natural resources with a very low economic efficiency compared to what nature has lost, which has revealed limitations defects, and defects. As humanity enters the 21st century, social polarization, poverty, and climate change threaten the security of the environment, energy, water resources, food, and culture on a global scale still present as a global urgent problem even in the civilized age. Although material wealth is constantly increasing, what is lacking the most is not wealth but justice. In particular, people also talk about the equality between generations in the enjoyment of natural resources and the environment. Injustice, poverty, conflict, environmental crisis, resource depletion are the

dangers that threaten the survival of humanity stemming from the very opposite sides of development. To solve these problems, people must rationally adjust the relationship between sustainable agricultural development and environmental protection and adaptation to climate change. The relationship between sustainable agricultural development and environmental protection and adaptation to climate change is one of the most urgent and outstanding issues that are studied by most scientists, not only in Vietnam, which of scientists abroad. Starting from this way of solving problems requires people to have different attitudes about the surrounding environment. The relationship between sustainable agricultural development and environmental protection and adaptation to climate change is reflected in actions in daily life, first of all in agricultural production.

As production develops, the level of human impact on nature increases. The scientific and technological revolution, on the one hand, has brought people great progress in conquering nature and developing production; on the other hand, it also makes the natural environment heavily polluted, causing many consequences of climate change. The negative side of agricultural development has been revealed more sharply than ever: the relationship between sustainable agricultural development and environmental protection, and adaptation to climate change is increasingly complicated, giving rise to problems hot on resources and the environment, threatening the survival of people and humanity. That forces us to change our view of agricultural development. Sustainable agricultural development became a new trend to replace the previous development concept and quickly gained widespread international support, becoming the mainstream theory to regulate the relationship between people and the environment natural environment, becoming a common development goal of all mankind.

The Mekong Delta has been entering a period of accelerating industrialization toward modernity. In addition to the great achievements in agriculture, the massive increase in natural exploitation and lack of awareness of protection has led to serious environmental consequences. The issue of green, clean, and sustainable agricultural production associated with the protection and rational use of natural resources and environmental improvement is being raised very urgently in the Mekong Delta in particular, in Vietnam today now in general. The downside of the market mechanism also gives rise to complex social problems that need to be resolved. Resolution 120 on sustainable development of the Mekong Delta to adapt to climate change has achieved many important results. Local governments at all levels and people have changed their thinking in agricultural production, transformed models to adapt to climate change, applied scientific and technological achievements, and organized production along value chains. There have been hundreds of models in localities that have brought into play their effectiveness, people's living standards are increasingly improved, awareness of saltwater and brackish water is a resource for restructuring, developing efficient production in each case ecoregions, current steps are in the right direction and initially effective, many economic models have brought high economic efficiency, people's lives are stable. Especially, the spirit of "goodness in heaven" is well understood by the government and people. The 13th National Congress of the Communist Party of Vietnam has stated its views on the 10-year socio-economic development strategy 2021-2030. In particular, the Mekong Delta region "... Promote economic restructuring, especially agricultural demand suitable for each ecological region, proactively adapt and effectively implement projects to respond to climate change climate change, sea level rise" (Communist Party of Vietnam, 2021, p.257). The issue of environmental protection and adaptation to climate change are issues of special importance, having great influence, relationships, interactions, and deciding the sustainable development of the land country; is the basis and premise for making guidelines and policies for socio-

economic development, ensuring national defense, security and social security. This is one of the most important tasks of the whole political system and has been identified by our Party as one of the six key tasks in the 13th Party Congress term. Resolution No. 19-NQ/TW dated June 16, 2022, of the Party Central Committee (term XIII) on agriculture, farmers, and rural areas for the period to 2030, vision to 2045. Decision No. 150 /QD-TTG dated January 28, 2022, by the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development for the 2021-2030 period, with a vision to 2050. Decision No. 749/QD-TTG dated On June 3, 2020, the Prime Minister approved the "National Digital Transformation Program to 2025, with an orientation to 2030.

How to be able to harmoniously solve the relationship between sustainable agricultural development and environmental protection and make progress and social justice is a problem that needs more theoretical and practical solutions. The article analyzes the current situation of the relationship between sustainable agricultural development and environmental protection and proposes some basic solutions to contribute to meeting the above requirements.

## **Material And Method**

The research is carried out based on the worldview and methodology of Marxism, and the views of scientists and organizations in the world and in Vietnam on sustainable development. Historical and logical methods are used to summarize key issues, sustainable development trends and cross-cutting issues.

The systematic approach is used to assess the status of climate change and environmental pollution, and at the same time to develop guidelines and policies in all fields to propose systematic solutions and cover. At the same time, the article also uses a synthesis of specific research methods such as comparison, analysis, synthesis, induction and inference, data synthesis, etc. to serve the research and presentation of the article (Tri, et al, 2022).

## **Results and Discussion**

### ***The current situation of green, clean, sustainable agricultural development, adaptation to climate change, and digital transformation in the Mekong Delta***

The Mekong Delta is a wide and fertile delta, formed about 7,000 years ago by the deposition of alluvium from the Mekong River and the coastal mudflow with a total natural area of 4,0921,7km<sup>2</sup> with a total population of 17,422,600 million people (General Statistics Office, 2021, p.90). Located adjacent to the Southeast region, the North and Northwest border Cambodia, Tay Ninh, and Ho Chi Minh City, the West and Southwest border the Gulf of Thailand, and the East and Southeast border the East Sea. The Mekong Delta has one city directly under the Central Government which is Can Tho city and 12 provinces: Long An, Tien Giang, Dong Thap, Vinh Long, Ben Tre, Tra Vinh, Hau Giang, An Giang, Soc Trang, Kien Giang, Bac Lieu and Ca Mau. With 134 districts, towns, and cities directly under the province (collectively referred to as district level) of which: there are 18 cities under the province, sections, 10 towns, and 101 districts; including 1605 communes, wards, and townships in which: 217 wards, 125 townships, 1263 communes (General Statistics Office, 2021, p.40). The whole region is limited from 110 - 8030' North latitude from Long An to Ca Mau and from 103<sup>0</sup>50' - 106<sup>0</sup>50' East longitude from Kien Giang to Ben Tre.

The Mekong River Delta accounts for 12% of the country's area and is home to  
**Res Militaris**, vol.12, n<sup>o</sup>2, Summer-Autumn 2022 7550

17,422,600 million people (General Statistics Office, 2021, p.90) population natural increase rate in the Mekong Delta is 5.5% (General Statistics Office, 2021, p.112), labor force From 15 years old and above, in 2021, the Mekong Delta will pretty abundant, about 9361.4 thousand people (General Statistics Office, 2021, p.145). The Mekong Delta creates jobs for more than two million stable workers, accounting for 18.9%. Havana critical position for the socio-economic development of the whole country here, with more than 2.5 million hectares of agricultural land annually producing 50% of food production, the whole region contributes 54% of rice production, providing 90% of exported rice, 65% of fruit production, 700,000 ha of aquaculture, accounting for 75% of aquatic production, exports, creating jobs for 65% of the region's population and contributing 20% GDP of the whole country, is an area that plays an important role in the national economy, is a key area for rice and rice production, contributing to ensuring national food security and export.

The labor force structure in urban and rural areas has a big difference, the rural unemployment rate in 2021 is 3.82% (General Statistics Office, 2021, p.164), higher than in 2020 (2.53%) 4.72% in urban areas in 2021 (General Statistics Office, 2021, p.164) higher than 2020 (3.73%). The underemployment rate of the labor force in the age group by region and by urban and rural areas: urban is 3.78%, rural is 4.51% (Underemployed people are those working under 35 hours a week and need to work overtime) (General Statistics Office, 2021, p.165), the rich-poor gap between urban and rural areas tends to increase. Digital technology is applied to the fields of cultivation, animal husbandry, forestry, and aquaculture, analyzing soils, plants, and growth stages of plants, making an important contribution to disease surveillance in management, operation, monitoring, environmental monitoring, pollution control, waste management, environmental impact assessment, forecasting for prevention and control of natural disasters, floods and droughts have reduced costs, saving manpower, time, and quality assurance should increase efficiency and sustainability.

The development of high-tech agriculture, clean and organic agriculture is focused, on gradually converting to crops and livestock with high productivity, quality, and efficiency, and increasingly asserting its role as the backbone of the economy in difficult times. Investment of enterprises in the agricultural sector tends to increase; production linkages along the value chain, closed and developed" (Communist Party of Vietnam, 2021, p.22), "Infrastructure of agriculture and rural areas has been upgraded and gradually modernized; synchronous irrigation infrastructure in the direction of multi-purpose; Many key and large-scale projects have been upgraded, repaired and completed, making an important contribution to promoting agricultural and rural development and increasing irrigation capacity, creating water supply and irrigation, and preventing salinity. Consolidating, perfecting and developing the organization of management and exploitation of small and in-field irrigation systems" (Communist Party of Vietnam, 2021, Vol.2, p.39-40). Digital technology has been used in connecting the consumption of agricultural products. Especially during the Covid-19 pandemic, social distancing must be implemented, disrupting the supply chain of agricultural products, digital technology has been used by localities in advertising, trade promotion, distribution, and distribution consumption of agricultural products, helping the agricultural industry overcome difficulties during the epidemic season. The connection of agricultural product consumption on a digital platform has facilitated, transparent information, reduced intermediary costs, created a close and multi-dimensional "link-cooperation" between management agencies and businesses and farmers, overcome the bottlenecks of a "fragmented, small, spontaneous" production; creating products that ensure quality, safety and responsibility, meeting the increasing demands of the market and consumers. The proactive application of digital technology to the management, production, and consumption

of agricultural products shows that the Mekong Delta's agriculture is gradually shifting from traditional agriculture to smart agriculture, green and clean agriculture. Sustainable agriculture creates a breakthrough that changes the face of rural areas in the Mekong Delta.

In addition to the achievements, it is also necessary to frankly admit that the Mekong Delta region has been facing many difficulties and challenges such as "agricultural development still has unsustainable factors", and growth is not stable (For example (1) Climate change; (2) Small household economy, fragmented production land; (3) The market for agricultural products is unstable; (4) Although the level of labor in agriculture and rural areas has increased, it is still low compared to the requirements). The agricultural digital transformation still has limitations, is not synchronized, is quite fragmented, and has not yet applied digital technology to forecast diseases, pests, and climate change there is a digital connection chain, and there is no new and comprehensive approach to the requirements of digital transformation. Renovation of production organization is still slow; the majority of enterprises and agricultural cooperatives are small-scale and have not operated effectively" (Communist Party of Vietnam, 2021, p.62), regional development linkages are still loose, not harmoniously linked with agricultural development environmental protection, domestic goods transport is mainly by road, logistics costs are still high, and exploitation of natural resources unsustainable resources, low efficiency in management and use, not following market principles, especially land, saline intrusion, acidification, riverbank, and coastal erosion have occurred seriously in some areas. In the Mekong Delta province, the planning, and planning management in some localities is still inadequate and lacks a long-term vision for the development of agriculture and rural areas. To realize the potential to become the socio-economic driving force of the whole region, food security is a burden, low quality of labor, poor transport and logistics infrastructure are major challenges with the Mekong Delta, because, growing rice in a small area, of about 0.3 ha, it is difficult to mechanize, increase productivity, and it is difficult to help farmers get rich here. This is a bottleneck that is holding back the sustainable and prosperous agricultural development and investment attraction of the region.

The agricultural digital transformation is slow, so the Mekong Delta is suffering from the dangers of climate change: floods cause flooding from 1.4 to 1.9 million hectares, and salinity penetrates deep into the area in the dry season. about 1.2 million to 1.6 million hectares of the coastal area; alum contamination on an area of about 1.2 to 1.4 million hectares in low-lying areas, lack of fresh water for production and daily life for about 2.1 million hectares. According to statistics in 2010, the Mekong Delta has only 99 points of erosion and landslides; By 2019, this number has reached 564 landslide points, an increase of 5 times, with a total length of 830km, each year 13 provinces and cities in the region lose 300-500ha of land. Polluted rivers not only lead to the destruction of agricultural lands but also destroy aquaculture areas. Thousands of households have lost their houses, land, and properties due to landslides, and people's lives and production are especially difficult. Especially, the severe drought and salinity in the Mekong Delta have caused 6 provinces, including Ben Tre, Long An, Tien Giang, Kien Giang, Vinh Long, and Ca Mau, to declare a serious shortage of fresh water due to drought. Salinity causes a shortage of fresh water for people in the Mekong Delta, threatening social order and security and the sustainable economic development of the whole region, which is a very alarming problem. This situation has partly caused difficulties and hindered the development of agriculture and rural areas, which is one of the reasons why many agricultural products have low competitiveness, affecting the income and life of farmers.

The level of farmers putting digital technology into production is still low. In digital agriculture, in addition to traditional means of production, farmers also have to use digital data and digital technology. Therefore, besides production skills, farmers must have more knowledge and skills in trade, digital technology, and biotechnology. However, the scientific and technological level of our farmers is still low, rural workers have undergone professional and technical training, and have not been trained in digital transformation, so they face difficulties in manipulation as well as evaluating effectiveness. It can be said that this barrier is the biggest obstacle to agricultural digital transformation in the coming period.

The digital transformation and digital technology in the production and business of agricultural products in the Mekong Delta is quite new, so the awareness of most localities, businesses, and especially farmers is still limited. Most of the subjects have not seen the position, role, and importance of applying digital technology in agricultural production and business. This makes it difficult to digitally transform the agricultural sector. Policies to serve the digital transformation of the agricultural sector are not appropriate, timely, practical, and cumbersome, and especially farmers - direct producers, hardly benefit.

Especially, at the beginning of 2020 and 2021, when the Covid-19 epidemic situation raged around the world, the Mekong Delta also faced the risk of a complicated and unpredictable epidemic, which had a strong impact on the economy, society, security, national defense, and people's life are still facing many difficulties; security and order in some localities are not good, negative phenomena and social evils have not been prevented in time and are still complicated, the situation of border order still contains many complicated factors, security and safety are still not good. Unpredictable developments in security, hinder the attraction of investment in border areas. The Covid-19 epidemic has had a very serious impact on all sectors of the economy and society, causing serious consequences for the growth of trade and services.

It is also because of the thought that too much emphasis is placed on economic growth despite the bad consequences of the environment, and climate change, along with the situation of natural resources being wasted and exploited indiscriminately. The Mekong Delta has become salt marshes with 1.8 million hectares of land being saline, contaminated with alum, desertification, and subsidence (over the last 10 years, it has been shown that the average land subsidence rate is 0.96 cm/year, while sea level rises only 0.35 cm/year This result shows that the rate of land subsidence is three times faster than sea level rise), according to statistics, the whole region has 562 points of riverbank and coastal erosion with a length of 786 km, of which 42 points are dangerous. With a length of nearly 150 km, environmental pollution has not been controlled, the problem of soil environmental pollution is due to the inappropriate use of chemicals, large residues in the soil, and overuse of pesticides causing adverse effects on the environment about 1,790 tons of silicide, 210 tons of herbicides, 1,224 tons of pesticides, and 4,245 tons of fungicides are used redundantly in rice production in the Mekong Delta Water in the Mekong Delta. The current situation in the Mekong Delta is a valuable lesson worth considering and pondering.

The agricultural production process in the Mekong Delta is generally still backward and underdeveloped. Outdated production processes lead to a high proportion of greenhouse gas emissions. The dissemination and technology transfer in agriculture is still weak, people do not know about horticulture, and have no concept of planting and caring for garden plants. In agriculture, large amounts of untreated waste are discharged directly into rivers, causing

environmental pollution. In particular, the view of sustainable agricultural development has not been deeply understood. Agricultural production uses too many chemical fertilizers and pesticides, including those banned in the world. Trends in production and social consumption are evolving according to the traditions of the formerly developed regions, consuming a lot of raw materials, and energy and emitting a lot of toxic wastes that have been and will continue to make the environment worse if the natural field is overloaded. All of the above limitations have been directly affecting people's lives, leaving immediate and long-term harmful consequences for people, and hindering sustainable agricultural development. The revenge of nature has been appearing before our eyes every minute, every hour, and is getting more and more serious.

The current situation of the relationship between sustainable agricultural development and environmental protection and adaptation to climate change in the Mekong Delta shows that: contradictions between viewpoints, institutions, and policies are outdated and slow to change with the requirements of the changing practice day by day. This has created gaps in management leading to problems such as negativity, bureaucracy, etc., creating opportunities for dishonest people, criminals, and profit-seeking people at all costs to take advantage of them destroying nature, destroying the environment, destroying the balance and harmony between humans and nature, and hinders sustainable development; Individual interests and group interests are promoted against the common interests of the social community, and the legitimate rights and interests of the people are seriously violated and require remedial action soon. The process of digital transformation of agriculture in the Mekong Delta still has many difficulties and challenges such as low level of mechanization, supporting technology for agricultural development (mechanical, deep processing, etc.) agricultural product testing lines, disease forecasting, pests, climate change, etc.) are inadequate; small and fragmented cultivation areas; forecasting output of agricultural products is still mainly based on experience; agricultural enterprises have not invested much in digital transformation; the quality of human resources with high expertise in digital agriculture is still limited; Farmers' awareness and skills in using digital technology are not high.

***Some key solutions to deal with the development of green, clean and sustainable agriculture, adaptation to climate change, and digital transformation in the Mekong Delta***

In the transition from a traditional agricultural area to a smart agricultural area, a contradiction has arisen between the level and capacity of people in perceiving and improving the laws of nature and society. Outdated production methods and technologies with the requirements of protecting nature, the environment, and sustainable agricultural development in the new period, require adequate investment in all aspects and must have solutions comprehensive, long-term, and urgent for the sustainable development of the Mekong Delta in the coming time.

First of all, to properly solve the relationship between green, clean and sustainable agricultural development, it is necessary to proactively develop a digital agricultural strategy, apply digital technology to digitize management data, and aim for automation. in the process of collecting - processing - reporting - storing statistical data systems in the fields of crop production, plant protection, animal husbandry - veterinary - fisheries, forest rangers, rural development, aquaculture benefits, clean water - rural environmental sanitation, agricultural extension, new rural areas, OCOP, specialized inspection - quality management, contributing to improving the effectiveness and efficiency of industry management. At the same time, to develop sustainable agriculture in association with environmental protection and climate change adaptation in the Mekong Delta, digital technology must be applied to digitize safe

production processes, brand names, and access origin according to the product supply chain to improve product quality, production efficiency and ensure information retrieval is convenient, public, transparent and accurate. Towards a comprehensive digital transformation in agricultural production, forming an automatic observation-monitoring network to serve production transformation activities in the direction of the agricultural economy, circular economy, and green economy in the field of agriculture. Sustainable agriculture is associated with environmental protection, and adaptation to climate change in the Mekong Delta.

To speed up the process of agricultural restructuring, rural economic development is in association with new rural construction. Developing large-scale concentrated commodity agriculture towards modernity, creativity in science, application of high technology, application of digital and market, increasing added value and sustainable development associated with conservation biodiversity, ecological environment protection, product branding associated with ecotourism development. "Encourage the development of green, clean agriculture, ecological agriculture, organic agriculture, high-tech, smart agriculture, adapting to climate change" (Communist Party of Vietnam, 2021, p.107). The strategy of sustainable agricultural and rural development is the basic orientation, pillar, and foundation to ensure food security, stabilize life, and contribute to international integration and export momentum one of the leading companies in the region, enhancing the position and prestige of the Mekong Delta.

Digital transformation helps the agricultural sector in the Mekong Delta reduce risks and damages caused by climate change. Agriculture is an industry that is highly dependent on weather and climate. The Mekong Delta is heavily affected by climate change. Promoting digital transformation in agriculture and rural areas, harmoniously solving the relationship between green, clean and low-waste agriculture, proactively adapting to climate change, and managing risks. The Mekong Delta promotes digital agriculture, applying digital technology to build a large database system on soil; on adaptive characteristics of plants, livestock, and aquatic products; on climate change, environmental pollution, on market information, serving the orientation of the development of large-scale, safe and circular production areas in association with trade promotion activities, connecting supply and demand, promote agricultural product brands, contribute to creating new values for agricultural products, contributing to the successful realization of the goal: rich people, strong country, democracy, justice, and civilization.

Secondly, it is necessary to complete and supplement the system of legal documents, mechanisms, and policies on environmental protection for sustainable development. The improvement of the system of legal documents needs to focus on synchronously and unifying the requirements for environmental protection associated with socio-economic development in the period of accelerating industrialization towards the direction of socio-economic development modernity and international integration. The Law on Environmental Protection was revised in 2020, however, for this law to be effectively implemented in increasingly complex conditions like today, it needs to be supplemented, revised, and further improved. It is necessary to complete the system of legal documents and issue specific legal documents such as regulations on waste management, biodiversity conservation management, regulations on environmental crimes, the relationship between the Law on Environmental Protection and specialized laws in regulating the law on the environment, synchronously promoting the power of administrative, criminal, civil and economic legal measures in handling violations of environmental laws, especially economic measures to ensure the harmony between agricultural development and environmental protection requirements for sustainable development. Develop a comprehensive set of assessment standards on all aspects of sustainable agricultural



development. The legal documents on the environment and sustainable agricultural development must be synchronized and compatible with the actual situation, avoid conflicts and overlaps, and, importantly, be strictly enforced in life enough to prevent wrongdoing and protect the common interests of the social community and the harmony and stability of nature.

Thirdly, digital transformation platform will be a tool for state management in the agricultural sector, widely available to relevant localities and sectors, to conduct staff training, and collect data from at commune, district, and provincial levels, at the Mekong Delta, it is necessary to consider the technological infrastructure to be deployed, make the most of the existing status, and select a few localities for trial operation. Sustainable and prosperous agricultural development must ensure development opportunities not only for today's generation but also for future generations, the ability to adapt and withstand changes, balance, and harmony with environmental, social, and economic factors, renewable raw materials, energy... in production requires the development of digital agriculture to manage and protect land resources, water resources, regulations the production process must be environmentally friendly, protect the landscape and adapt to climate change; rationally and economically using input materials and resources, without adversely affecting the environment and human health, by objective laws and respecting natural laws for agricultural development. If we go against that objective necessity, it will have a significant impact on food security, environmental pollution, and climate change in the region and also the whole country.

In recent years, the Mekong Delta region has had the lowest labor training index in the country. Therefore, in the coming time, the region needs to focus on improving the quantity, quality, knowledge, and attitude of human resources, there is no true seaport and logistics center. Therefore, more than 70% of imported and exported goods have to be transshipped through ports in Ho Chi Minh City, the Southeast, causing the cost of logistics to increase by 10-20%, making goods less competitive bottlenecks inhibiting agricultural development in the Mekong Delta. A top priority of the region, in the coming time, it is necessary to urgently complete the transport infrastructure system, reduce transportation costs, and attract investors. Continue to improve the coordination mechanism for regional development to improve efficiency, in fact, in the direction of reducing focal points, taking intelligent management of water and land resources, and adapting to climate change, in line with the current conditions. In the context of the Mekong Delta's practice, strengthening disaster risk management is a priority, whether climate change impacts or not.

Fourthly, the Mekong Delta is the country's largest rice granary and has strengths in aquaculture, these two fields will be most affected when the process of saline intrusion changes the soil environment and water sources applying digital technology in forecasting and warning the market, connecting supply and demand to develop the agricultural market, avoiding risks. Therefore, the digital transformation of the agricultural sector must be the foundation and must be a top priority. At the same time, it is necessary to diversify crops to reduce market risks and build agricultural production chains, by the characteristics and conditions of the region. Digital agriculture in the Mekong Delta is the change from pure agricultural thinking to "agricultural economic thinking, smart agricultural economy", from quantity development to quality, agriculture clean associated with the value chain and brand building. One of the most important factors for realizing that point of view is the team of experts and scientists from institutes and universities that work together with the business community to lead farmers to change. Prime Minister Nguyen Xuan Phuc emphasized: The Mekong Delta develops in the direction of "favorable heaven", must be versatile to take advantage of opportunities, adapt in time, "save

yourself before God saves" completely. It is completely suitable for us (Prime Minister Nguyen Xuan Phuc chaired a meeting to review the 3-year implementation of the Government's Resolution No.120/NQ-CP on sustainable development of the Mekong Delta in response to climate change). Determining that adaptation to climate change is an inevitable trend, must live together and adapt, must turn challenges into opportunities; choose a model that adapts to nature, is environmentally friendly, and develops sustainably under the motto of proactively living with floods, brackish inundation, mangroves, etc. Adapting to climate change is increasingly becoming a task urgent, and vital, with both immediate and long-term significance for the sustainable economic development of the Mekong Delta.

Fifthly, the digital transformation of the agricultural sector plays a particularly important role in restructuring the agricultural sector, developing concentrated, large-scale commodity agriculture towards modernity, high-added value, and sustainability affirming the role of the "support" of the economy, becoming "a measure of the sustainability of the Mekong Delta. Digital transformation is an important solution to help farmers and businesses produce quality agricultural products at the lowest cost, creating a breakthrough in productivity, quality, and competitiveness for agricultural products. It is necessary to join hands and participate in the participation of provinces and cities in the Mekong Delta to create a push to promote regional linkages results, the synergy of the region. In the coming time, provinces in the Mekong Delta need to accelerate the transformation of growth models associated with restructuring the agricultural economy towards green and sustainable growth.

Local authorities and people in the Mekong Delta need to change their agricultural production thinking, promote creativity, and proactively adapt to climate change. It is necessary to have many models and initiatives for localities and people in the coming time, to overcome droughts, salinity and landslides to gradually adapt. However, in the face of the upcoming challenges, it is necessary to continue to improve mechanisms and policies so that Resolution 120 is a guideline for agricultural development in the Mekong Delta region to be sustainable, prosperous, and bring prosperity. breakthrough in the coming time, it is necessary to pay attention to finding a way to major markets for agricultural products of the region, it is necessary to upgrade and move towards building a modern digital technology infrastructure that directly connects goods with the international market. By sea, Cai Cui Can Tho International Port can receive ships of 20,000 tons, but there is no cargo in and out because of the Hau river channel, the investment plan is not complete, and this is a huge bottleneck of the Mekong Delta by the Mekong River. Besides the human factor, which is one of the key issues in successfully transforming the agricultural sector.

Sixthly, support and advise farmers in the Mekong Delta to know how to apply Internet of Things technology to the production process, exploit supply and demand information through the Internet, and how to advertise online, buying and selling online, about engineering and technology: research and application of biotechnology; develop the production of organic fertilizers for the development of ecological agriculture; expanding the application of organic agricultural production, universalizing the process of integrated pest control; conservation of genetic resources of local plant varieties; promote research and application of advanced technologies to preserve and process agricultural products.

Creating a green and sustainable agricultural development mechanism must be through improving green, clean, and advanced technology as a top priority, with a digital platform that will contribute to mitigating and adapting to climate change in Vietnam. Mekong Delta region.

Must respect the laws of nature, choose a model that adapts to nature, and avoid violent interference with nature. The above challenges are not predicted but present. Having to keep the land, keep the water, and especially the people, is called successfully adapting to nature. Changing the motto of living with floods to actively living with salinity and drought, saving freshwater use, ensuring organic cohesion in the region as well as linking with the southern key economic region and sub-region Mekong River.

Seventhly, improve the quality of life and strengthen international cooperation on the green, clean, and sustainable agricultural development associated with environmental protection, and climate change adaptation in agricultural digital transformation in the Delta. In the Mekong River Delta, the government and local authorities also constantly raise people's awareness through propaganda and education activities, renewing thinking, unifying awareness and actions, and living an environmentally friendly lifestyle, green lifestyle. With the slogan "All for a wealthy community". The State must come up with many policies to encourage the active participation of the people for the sustainable development and prosperity of the community, in which green agricultural production, green consumption, and saving of energy and natural resources are required. The campaign to promote green life is one of the goals of sustainable agricultural development associated with environmental protection and adaptation to climate change in the Mekong Delta.

Comprehensive agricultural development towards modern, efficient, and high-value-added agriculture. Build rural areas, increase incomes and improve living conditions for people, strengthen capacity to prevent and mitigate the impacts of climate change, protect and effectively and sustainably use natural resources, and ensure raw materials and environment.

Eighthly, to successfully implement Resolution No. 19-NQ/TW dated June 16, 2022, of the Party Central Committee (term XIII) on agriculture, farmers, and rural areas in the period to 2030, with a vision to 2045; Decision No. 150/QĐ-TTĐ dated January 28, 2022, of the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development from 2021 to 2030, with a vision to 2050, must promote the role the subject of farmers in the Mekong Delta provinces in sustainable agricultural development. It is necessary to approve and promote the role of Farmers' Unions at all levels, innovating contents and modes of operation, raising awareness, changing agricultural production thinking towards sustainability, diversifying agricultural products, ensuring productivity, quality, increase in economic value, and ensuring food safety of farmers in the Mekong Delta, by the efforts of the will to be self-reliant, self-reliant, and not dependent on must change the way of thinking, doing, new awareness about the position, role, position, capacity to master, comprehensively improve the material and spiritual life of farmers and rural residents.

Raise farmers' awareness about the role and importance of digital technology application in the production and agricultural products of the Mekong Delta in the market. This is a prerequisite in digital transformation. Only when realizing the role and importance of implementing digital technology in agriculture can farmers actively learn and apply digital technology to agricultural production and business, creating the foundation for digital transformation in the agricultural industry. Promote information, communication, and propaganda on mass media, organize seminars, and agricultural extension models on the need, role, and benefits of digital technology application in the management operating, producing, and consuming agricultural products in the context of climate change, 4.0 technology, and international integration.

Digital transformation of the agricultural sector and rural development play a particularly important role in restructuring the agricultural sector, developing concentrated and large-scale commodity agriculture towards modernity, high-added value, and sustainability, affirming the role of the "support" of the economy, becoming a "measure of the level of sustainability of the country". Digital transformation is an important solution to help farmers and businesses produce quality agricultural products with the lowest cost, but with the highest profit. This goal is also being promoted by industries, localities, businesses, and people, with the expectation of creating a breakthrough in productivity, quality, and competitiveness for agricultural products. Promoting the active role of farmers in the Mekong Delta to participate in linkage models and collective economic forms in agricultural production "Thuy Thien Agriculture", "Green agriculture", "cooperative group, large sample fields," "Farmers' Association," "Four-house linkage model," "Each farmer is a trader, each cooperative is an enterprise applying digital technology", smart farm, participating in domestic and global value chains, consolidating and exchanging plots, large sample fields, multi-value integration, interdisciplinary, regional connectivity, efficient and sustainable use of resources nature associated with environmental protection, ecology builds linkages, applies and masters science and technology, intellectualizes farmers to reduce costs, increase quality, diversify processing, create a foundation to establish new-type cooperatives, build smart villages, build green and clean agriculture, create brands associated with ecotourism development, contribute to creating new values in production, ensure food substance, go in-depth, effective, for the benefit of the people, and at the same time prepare to test the agricultural digital transformation and production management platform, support safe production data management, source traceability; applying technology to administrative procedures in setting up, monitoring and automating data collection, processing and statistics through the application of remote sensing technology; through IoT monitoring equipment, artificial intelligence algorithms to manage and warn of pests and natural disasters..., gradually opening people's participation in the agricultural digital transformation platform and production management, easy access to information on pest warnings, weather, markets, scientific achievements, new technologies, automation and more efficient management of production processes, bringing agricultural products to consumers fastest, reduce intermediaries costs, improve competitiveness and production efficiency, build professional farmers to adapt to the digital economy, the circular economy, with the biggest goal being income and people's lives farmers.

## **Conclusion**

With the serious and catastrophic impacts of climate change, in order to ensure food security and develop green, clean and sustainable agriculture, the digital transformation of the agricultural sector plays a particularly important role in restructuring the agricultural sector, developing concentrated commodity agriculture, large-scale in the direction of modernity, producing quality agricultural products with the lowest cost, high added value, achieving the highest profit and sustainability is a measure of the sustainability of the Mekong Delta". Raising awareness to change the mindset of "agricultural production thinking" to "agricultural economic thinking", moving from a traditional agricultural area to a digital agriculture, smart agriculture, green agriculture, friendly, applying digital technology "clean production", linking to create product value chains between localities in the region, creating a breakthrough in productivity, quality and competitiveness for agricultural products. Not only in the short term, but in the long term and sustainable.

## References

- Communist Party of Vietnam. (2021). Document of the 13th National Congress of Deputies. Hanoi: National Political.
- Marx, K & Engels, F. (1994). Complete volume, Vol.20. Hanoi: National political.
- Government. (2017). Resolution 120 of the Prime Minister, on sustainable development of the Mekong Delta to adapt to climate change. Hanoi.
- Government. (2020). Decision No. 749/QĐ-TTg dated June 3, 2020 of the Prime Minister approving the “National Digital Transformation Program to 2025, with orientation to 2030. Hanoi.
- Government. (2022). Resolution No. 19-NQ/TW dated June 16, 2022 of the Party Central Committee (term XIII) on agriculture, farmers and rural areas for the period to 2030, with a vision to 2045. Hanoi.
- Government. (2022). Decision No. 150/QĐ-TTg dated January 28, 2022 of the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development for the period of 2021 - 2030, with a vision to 2050. Hanoi.
- Tri, N. M., Anh, T. T., & Hoa, L. T. (2022). Development of the Social Security in Vietnam: Reality and Solutions. *Journal of Educational and Social Research*, 12(5), 108. <https://doi.org/10.36941/jesr-2022-0126>