

THE RELATIONSHIP BETWEEN GREEN, SUSTAINABLE AGRICULTURAL DEVELOPMENT, CLIMATE CHANGE ADAPTATION, AND DIGITAL TRANSFORMATION IN DONG THAP, VIETNAM

A RELAÇÃO ENTRE DESENVOLVIMENTO AGRÍCOLA VERDE E SUSTENTÁVEL, ADAPTAÇÃO À MUDANÇA CLIMÁTICA E TRANSFORMAÇÃO DIGITAL EM DONG THAP, VIETNAM*

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Abstract: The issues of agriculture, rural areas, climate change and digital transformation are a major policy of our Party and State. Dong Thap in Vietnam is a locality that has been continuing to be affected by environmental pollution, climate change, and epidemics. These greatly affect agricultural development. If this issue is not resolved timely, it will have significant impacts in the future. The paper initially studies the relationship between green, clean and sustainable agricultural development, adaptation to climate change, and agricultural digital transformation in Dong Thap. This is an inevitable and objective trend, the “key”, the foundation for sustainable development of Dong Thap agricultural sector, thereby contributing to the successful implementation of Resolution of the Party Congress of Dong Thap province, term XI.

Keywords: Dong Thap. Vietnam. Sustainable green agricultural development. Digital transformation. Climate change.

Resumo: As questões de agricultura, áreas rurais, mudança climática e transformação digital são uma das principais políticas de nosso Partido e Estado. Dong Thap no Vietnã é uma localidade que continua a ser afetada pela poluição ambiental, mudança climática e epidemias. Estas afetam muito o desenvolvimento agrícola. Se esta questão não for resolvida em tempo hábil, ela terá impactos significativos no futuro. O documento inicialmente estuda a relação entre desenvolvimento agrícola verde, limpo e sustentável, adaptação à mudança climática, e transformação digital agrícola em Dong Thap. Esta é uma tendência inevitável e objetiva, a "chave", a base para o desenvolvimento sustentável do setor agrícola de Dong Thap, contribuindo assim para a implementação bem sucedida da Resolução do Congresso do Partido da província de Dong Thap, termo XI.

Palavras-chave: Dong Thap. Vietnã. Desenvolvimento agrícola verde sustentável. Transformação digital. Mudança climática.

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1. INTRODUCTION

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

Dong Thap has been entering a period of accelerating industrialization towards modernity. In addition to the great achievements in agriculture, the massive increase in natural exploitation, and the lack of awareness of protection have led to extremely serious consequences on the environment, climate change, soil degradation... The issue of green, clean and sustainable agricultural production associated with digital transformation to manage, protect and rationally use natural resources, and improve the environment, is being raised very urgently in Dong Thap in particular, in Vietnam today 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. At all levels of government in Dong Thap province, people have changed their thinking in agricultural production, transformed models to adapt to climate change, applied the scientific, technical and digital achievements, and organized production along the value chain. There have been hundreds of models in localities that have brought into play their effectiveness. People's living standards are increasingly improved. They are aware that saltwater and brackish water are resources for restructuring, developing efficient production according to each ecological zone. Current steps are in the right direction and initially effective. Many economic models have brought high economic efficiency, people's stable lives. Especially, the spirit of "Heaven's will" is well understood by the government and people. The 13th National Congress of the Communist Party of Vietnam has stated its viewpoints in the 10-year socio-economic development strategy 2021-2030. In which, the Mekong River Delta region "...Promote economic restructuring, especially the agricultural structure which fits each ecological region; proactively adapts and effectively implements projects to respond to climate change, sea level rise..." (Communist Party of Vietnam, 2021, volume I, p.257).

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-TTg dated January 28, 2022 of the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development for the 2021 - 2030 period, with a vision to 2050 and Resolutions and conclusions of the action program and the plan of the Executive Committee of the Provincial Party Committee and the Provincial Standing Committee, term XI. Environmental protection, climate change adaptation, and digital transformation in agriculture are issues of special importance, having great influence, mutual impact, jointly deciding the sustainable development of the province and the country; are 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 is identified by our Party as one of the six key tasks during the 13th Party Congress.

How can the relationship between green, clean and sustainable agricultural development, adaptation to climate change, digital transformation in agriculture and implementation of progress, social justice, is harmoniously resolved? The problem requires a theoretical as well as a practical solution. The paper analyzes the current situation of the relationship between green, clean and sustainable agricultural development with environmental protection, digital transformation and proposes some basic solutions to contribute to the successful realization of the goal of wealthy people, strong country, and a democratic, fair and civilized society.

2. RESULTS AND DISCUSSION

2.1. Current Situation Of Green, Clean, Sustainable Agricultural Development, Adaptation To Climate Change, And Digital Transformation In The Mekong Delta

Dong Thap is a province located in Southeast region, in the Mekong Delta. The total natural area of the province is 3,283km², of which: the area of Dong Thap Muoi is 2,477 km², accounting for 46.29% of the natural area of Dong Thap Muoi. Dong Thap is one of 13 provinces in the Mekong Delta, where the headwaters of the Tien River flows across the border into Vietnam. The province's boundary is divided into two distinct parts: Dong Thap Muoi and the alluvial land between Tien and Hau rivers. Dong Thap province has 12 administrative units, including: 03 cities under the province (Cao Lanh city, Sa Dec city and Hong Ngu city and 9 districts: Cao Lanh, Chau Thanh, Hong Ngu, Lai Vung, Lap Vo, Tam

Nong, Tan Hong, Thanh Binh, Thap Muoi. The province has 143 communes, wards and towns. By the end of September 2021, the population of province Dong Thap reached about 1,586,438 people.

Dong Thap was affected by the early and heaviest 4th Covid-19 outbreak in the country, so Dong Thap was soon affected by the Covid-19 wave, affected by drought and salinity intrusion. However, agricultural production of the province is quite stable, the quality of output products has been improved, so it has increased the production value in the agricultural sector, thereby increasing the added value by about 135 billion VND compared to 2020 (comparative price 2010). With the fisheries sector, domestic consumption is promoted, but due to many difficulties in export, the output of aquatic products (aquaculture and fishing) is estimated to increase only slightly by 7,450 tons, thereby reducing the production value of the fishery industry, leading to an increase in the value of about 8 billion dong. In sum, the added value of the Agriculture, forestry and fishery sector increased by 516 billion VND (including other products), making this sector grow by 2.67% compared to 2020 and contribute to the overall growth of 0.94% (Dong Thap Statistical Office, 2021).

The total planting area of annual crops in 2021 reach 536,464 ha, decreases 2.45% or decreases 13,462 ha compared to 2020. It was estimated that the results of the livestock industry in 2021 of Dong Thap province in terms of livestock products compared to 2020, are as follows: Output of live-weight buffalo meat for slaughter for the whole year is 676 tons, equaling 104.64%; Output of live-weight beef for slaughter for the whole year is 8,275 tons, equaling 104.75%; The estimated number of pigs released for slaughter for the whole year reached 360,960 heads with the output of live-weight pork of 34,269 tons, equaling 100.35%; Chickens: the estimated number of chickens released for the whole year is 2,301 thousand heads (up by 5.0%), the output of live-weight meat for slaughter is 3,681 tons, an increase of 201 tons (up by 5.78%); egg production for the whole year is 7,391,000 eggs (an increase of 5.71%); Ducks: The estimated number of ducks released for the whole year was 3,448 thousand (an increase of 5.19%), the output of live-weight meat for slaughter was 7,573 tons (an increase of 5.61%), egg production was 322,031 thousand eggs (an increase of 5.67%).); Muscovy ducks: the number of heads sold for the whole year was 148 thousand (an increase of 4.23%); the output of live-weight meat for slaughter was 381 tons (up by 4.71%); egg production was 463 thousand eggs (up by 4.54%); Goose: the number of heads released from slaughter for the whole year was 5.59 thousand (an increase of 4.49%); the output of live-weight meat for slaughter was 23 tons (up by 4.55%); egg

production was 53,000 eggs (up by 3.92%). The province's pig farm is one of the items in the agricultural restructuring project of Dong Thap province. However, the province's pig farming industry is considered a high-risk industry, because it is mainly farmed on a small scale. With the duck farming industry in the past year, there have been many positive changes. From a passive position on the consumption market, livestock solutions in the direction of safety, linking together and changing the way of doing things..are helping farmers in the province to be active in both husbandry and consumption” (Dong Thap Statistical Office, 2021).

Despite difficulties caused by the Covid-19 pandemic, Dong Thap's agricultural production “continues to develop, cooperate, link in production and consumption, and has a positive change, especially during the peak epidemic period. Continuing to implement the agricultural restructuring project with the goal of improving the value chain of each commodity in order to increase income and improve people's living standards (but not increase area and output), the province has reorganized agricultural production, associate with the consumption market, encourage and support the conversion of crops and livestock with high economic value; implement safe production processes, apply science - technology, information technology and implement mechanization to reduce production costs” (Dong Thap Statistical Office, 2021). In particular, the province soon had a policy of applying digital transformation in the fields of cultivation, animal husbandry, forestry and aquaculture, analyzing soil types, plants, growth stages of plants. This contributed to an important part in disease surveillance, in management, administration, monitoring, environmental monitoring, pollution control, waste management, environmental impact assessment, forecasting for prevention of natural disasters, floods, droughts. As a result, it has reduced costs, saved manpower and time, and ensured quality, thus increasing efficiency and sustainability.

The development of high-tech agriculture, clean and organic agriculture has been focused. It has gradually converted to crops and livestock with high productivity, quality and efficiency, thereby increasingly asserting its role as the backbone of the economy in difficult times. Investment of enterprises in the agricultural sector tends to increase; the closed production linkages along the value chain has development” (Communist Party of Vietnam, 2021, volume 2, p.22), “*Agricultural and rural infrastructures* are upgraded and gradually modernized; synchronous irrigation infrastructure is 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 drainage, and preventing salinity... Consolidate, perfect and develop the organization of management and exploitation of small irrigation systems and in-field irrigation,” (Communist Party of Vietnam, 2021, volume 2, pp.39-40). Digital technology has been used in connecting the consumption of agricultural products. Especially, during the Covid 19 pandemic, social distancing disrupted the supply chain of agricultural products. Digital technology has been used by localities to advertise, promote trade, promote distribution and consumption of agricultural products, thereby helping the agricultural industry to overcome difficulties during the epidemic. The connection of agricultural product consumption on a digital platform has facilitated for transparent information, reducing intermediary costs, creating a close multi-dimensional “link - cooperation” between management agencies, businesses and farmers, overcoming 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 Dong Thap agriculture is gradually shifting from traditional agriculture to smart agriculture, green, clean and sustainable agriculture. Digital transformation in agriculture creates a breakthrough that changes the face of rural areas in Dong Thap.

Besides the achievements, it is also necessary to frankly admit that Dong Thap has been facing many difficulties and challenges such as agricultural development still has unsustainable factors and unstable growth; climate change; small household economy; fragmented production land; unstable market for agricultural products; the labor level in agriculture and rural areas has increased, but it is still low compared to the requirements. The agricultural digital transformation still has limitations, asynchrony, fragmentation, and has not yet applied digital technology to forecast epidemics, pests, and climate change, seems to still follow the old thinking, does not have a digital connection chain, does not have a new and comprehensive approach as required by digital transformation. The reform of production organization is still slow; the majority of agricultural enterprises and cooperatives are small in scale and have not operated effectively” (Communist Party of Vietnam, 2021, volume 2, p.62); the regional development linkages are still loose, not in harmony with agricultural development and environmental protection; domestic freight transport is mainly by road; logistics costs are still high; resource exploitation is unsustainable; management and use efficiency are not good, not following the market principles; especially, the situation of saline intrusion, acidification, river bank and coastal

erosion occurred seriously in some localities in Dong Thap province; planning and management are still inadequate, lacking a long-term vision in the development of agriculture and rural areas; not boldly promoting digital transformation in agriculture; not really arousing the potential to become the driving force for socio-economic promotion of the province; The burden of food security, low quality of labor, poor transport and logistics infrastructure are big challenges for Dong Thap, because, growing rice with a small area, about 0.3 ha, is difficult to mechanize, increase productivity, difficult to help farmers well off. This is the bottleneck that is holding back the development of green, clean and sustainable agriculture, attracting investment of the province.

The agricultural digital transformation is slow, so Dong Thap is suffering from the dangers of climate change. 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; people's lives and production are especially difficult, threatening social order and security and sustainable economic development. This is a very alarming issue. This situation has partly caused difficulties and hindered the development of agriculture and rural areas. It is one of the reasons why many agricultural products have low competitiveness, affecting the income and life of farmers.

Moreover, the level of farmers to put 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, along with production skills, farmers must have more knowledge and skills in trade, digital technology, biotechnology...However, the scientific and technological level of Dong Thap farmers is still low. Labors in rural areas have not received professional and technical training, have not been trained in digital transformation, so it is difficult to manipulate as well as evaluate effectiveness. It can be said that this barrier is the biggest obstacle in agricultural digital transformation in the coming period.

The digital technology and digital transformation into production, business of agricultural products in Dong Thap is quite new, so the awareness of most localities, businesses, 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 digital transformation of the agricultural sector. Policy to serve the digital transformation of the agricultural sector are not appropriate, timely, practical. Its procedures is complex. Especially, farmers, direct production subjects, hardly gain any benefit.

Especially, at the beginning of 2020 and 2021, when the situation of Covid-19 epidemic raged around the world, Dong Thap also faced the risk of complicated and unpredictable epidemic, strongly affecting the socio-economy, security and defense, people's lives 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 have complicated developments; the border order situation still has many potential complications; security developments are unpredictable; thereby hindering the attraction of investment in border areas. The Covid-19 epidemic has had very serious impacts on all areas of the society-economy, causing serious consequences for the growth of trade and services.

It is due to the thought of focusing too much on economic growth, the negative consequences on the environment arise, climate is changed, natural resources is wasted, exploited blunderingly, and landslide is dangerous. Every year, appropriately hundreds of tons of yellow snails and snails killers, herbicides, pesticides and fungicides are used in excess in rice production and animal husbandry in Dong Thap. The current situation in Dong Thap is a valuable lesson to consider and reflect.

The agricultural production process in Dong Thap is generally still in a backward and underdeveloped state. Outdated production processes lead to a high proportion of greenhouse gas emissions. The technology transfer and popularizing in agriculture are still weak. People have no knowledge about horticulture, 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 much chemical fertilizers and pesticides, including those banned in the world. Trends in production and social consumption are evolving according to the past tradition, which consumed a lot of raw materials, energy and emitted a lot of toxic wastes which have been continuing to overload the natural environment. All of the above limitations have been directly affecting people's lives, not only leaving immediate and long-term consequences for people, but also hindering the development of green, clean and sustainable agriculture. The revenge of nature has been appearing before our eyes minute by minute, hour by hour and becoming more and more serious.

The current status of the relationship between green, clean and sustainable agricultural development, adaptation to climate change, application of digital technology and digital transformation in agriculture in Dong Thap shows that: conflicts between

viewpoints, institutions, policies and awareness, mindset innovation in agriculture (hereditary) have not yet met the requirements of reality. This has created gaps in management, leading to problems such as negativity, bureaucracy, etc., creating opportunities for dishonest people, criminals, profit-seeking people at all costs to take advantage of nature, destroy the environment, destroy the balance and harmony between humans and nature, hinder sustainable development; Individual interests and group interests are absolutely promoted against the common interests of the social community; the legitimate rights and interests of the people are seriously violated, and this require remedial action soon. The process of digital transformation of the agricultural sector in Dong Thap still faces many difficulties and challenges such as: the level of mechanization is still low, technology for agricultural development (mechanics, deep processing, agricultural product testing lines, forecasts about diseases, pests, climate change...) is not commensurate; small and fragmented cultivation areas; forecasting the 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.

2.2. Some Key Solutions To Solve The Relationship Between Green, Clean, Sustainable Agricultural Development, Adaptation To Climate Change, And Digital Transformation In Dong Thap

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; between production methods and outdated technology with the requirements of protecting nature and the environment. Developing the green, clean and sustainable agriculture, and digital transformation in agriculture in the new era...require adequate investment in all aspects; there must be radical, comprehensive and synchronous solutions for sustainable agricultural development in Dong Thap 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, irrigation, clean water - rural environmental sanitation, agricultural extension, new rural areas, OCOP (One Commune One Product), specialized inspection - quality management. This contributes to improving the effectiveness, efficiency of industry management. At the same time, to develop sustainable agriculture associated with environmental protection and climate change adaptation in Dong Thap, it is necessary to apply digital technology to digitize safe production processes, brands, and have traceability along the product supply chain in order to improve product quality, production efficiency and ensure that retrieval information is convenient, public, transparent and accurate. It is necessary to move towards a comprehensive digital transformation in agricultural production, form an automatic observation-monitoring network to serve the production shift towards agricultural economy, circular economy and green economy in the field of sustainable agriculture in association with environmental protection and adaptation to climate change in Dong Thap.

Boosting the process of restructuring the agricultural sector, developing the rural economy 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 biodiversity conservation, ecological environment protection, building product brands associated with eco-tourism development. “Encourage development of green, clean agriculture, ecological agriculture, organic agriculture, smart high-tech agriculture, and climate change adaptation” (Communist Party of Vietnam, 2021, volume 2, p.107). The strategy of sustainable agricultural and rural development is the basic orientation, is pillar and foundation to ensure food security, stabilize life, and contribute to international integration and facilitate the leading export in the region, thereby enhancing the position and prestige of Dong Thap.

Digital transformation helps Dong Thap's agriculture to reduce risks and damage caused by climate change, because agriculture is an industry that is highly dependent on weather and climate. 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. Promoting 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 developing large-scale, safe, circular production areas associated with trade promotion activities, connecting supply and

demand, promoting agricultural product brands, contributing to creating new values for agricultural products, contributing to the successful realization of the following goals: rich people, strong country, the democratic, just and civilized society.

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 uniformly the requirements for environmental protection associated with socio-economic development in the period of accelerating industrialization towards modernity and international integration. The Law on Environmental Protection was revised in 2020. However, in order for this law to be effectively implemented in today's increasingly complex conditions, it needs to be supplemented, amended and further perfected. 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, etc. Resolving the relationship between the Law on Environmental Protection and the digital transformation documents, especially economic measures to ensure the harmony between agricultural development and environmental protection requirements for sustainable development. Developing a set of comprehensive assessment standards on all aspects of sustainable agricultural development. Legal documents on environment and sustainable agricultural development must be synchronous, suitable to the actual situation, for the common interests of the social community and the nature's harmony and stability.

Thirdly, digital transformation in the agricultural sector is really the foundation and tool for state management in the agricultural sector, in accordance with objective laws and respecting natural laws for agricultural development according to Heaven's Will. If we go against that objective necessity, it will have a significant impact on food security, environmental pollution, climate change of the province, widely to the localities and related industries, to conduct training for staff, collect data from commune, district, to provincial levels. In the implementation, it is necessary to consider the technological infrastructure to be deployed, make the most of the existing situation, and select a few localities to pilot the development of environmentally-friendly digital agriculture. It must ensure development opportunities not only for current generation but also for future generations.

In recent years, Dong Thap has had a low labor-training index. Therefore, in the coming time, the region needs to focus on improving the quantity, quality, knowledge and attitude of human resources and a proper logistics center, so that the imported and exported

goods have to be transshipped through other provinces in the region, Ho Chi Minh City, Southeast, areas and the world. This causes logistics costs to increase by 10-40%, makes goods less competitive. This is a bottleneck hindering the agricultural development of the province. A top priority of Dong Thap, in the coming time, it is necessary to urgently improve the transport infrastructure system, reduce transportation costs, and attract investors. Continuing to improve mechanisms and apply digital technology in regional coordination and linkage to improve substantive efficiency, in the direction of reducing focal points, reducing intermediaries; and taking smart management, risk management due to natural disasters, epidemics, markets... as the top priority.

Fourthly, Dong Thap has strengths in agriculture and aquaculture, these fields will be most affected when the saltwater intrusion process changes the soil environment and water source. It must apply digital technology in the management, forecasting and warning of the market and providing information in the supply - demand connection to develop the agricultural market, avoid risks. Therefore, 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 minimize market risks, and build agricultural production chains which are suitable to the characteristics and conditions of the province. Digital agriculture in Dong Thap is a change from the thought of pure agriculture to “the thought of agricultural economy, a smart agricultural economy”, shifting from quantity development to quality one, the clean agriculture associated with value chains 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. The development of the Mekong Delta in the direction of “Heaven's Will” is main. It must take advantage of opportunities, adapt in time, “save yourself before Heaven saves”. This direction is perfectly suitable for us. Determining that adaptation to climate change is an inevitable trend, we must live together and adapt, must turn challenges into opportunities; choose a model that adapts to nature, is friendly to the environment, digital transformation and sustainable development under the motto of proactively living with floods, salt inundation, brackish inundation... Climate change adaptation is increasingly becoming an urgent and vital task, having both immediate and long-term significance for the sustainable economic development of Dong Thap.

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 “supporting” role of the economy, becoming “a measure of the sustainability of Dong Thap. 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 whole political system in Dong Thap to create an impetus to promote regional linkages; strengthen linkages and substantive cooperation with other localities to promote efficiency and synergy of the region.

Local authorities and people of Dong Thap need to change the backward thinking of traditional agricultural production, promote creativity, proactively adapt to climate change and apply digital technology in management, forecasting diseases, pests, consumption of agricultural products. It needs to have many models and initiatives of localities and people in the coming time, to overcome salinity drought and landslides to gradually adapt. However, in the face of upcoming challenges, it is necessary to continue to improve mechanisms and policies for 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-TTg dated January 28, 2022 of the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development in the 2021 - 2030 period, with a vision to 2050; Resolution 120 is the guideline for Dong Thap's green, clean, sustainable agricultural development, which is prosperous and breakthrough. Besides, it is also necessary to pay attention to finding a way to major markets for agricultural products, upgrading and moving towards building a modern digital technology infrastructure for goods directly connected to the international market. This is a huge bottleneck of Dong Thap. In addition to the human factor, capital is one of the key issues for successful digital transformation of the agricultural sector.

Sixthly, supporting and advising Dong Thap farmers to know how to apply Internet of Things technology to the production process, exploit supply and demand information through the Internet, how to advertise online, buy and sell online, about engineering and technology: do research and apply biotechnology; develop production of organic fertilizers for ecological agriculture development; expand the application of organic agricultural production, universalize the process of integrated pest control; conserve 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 innovation in green, clean and advanced technology. This is a top priority, and a digital

platform will contribute to mitigating and adapting to climate change. It 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 existing. It must keep the land, keep the water, and especially keep the people. This is called successfully adapting to nature. Changing the motto of living with floods to proactively living with salinity and drought; saving fuel, ensuring organic cohesion in the region as well as linking with the Southern key economic region and the Mekong sub-region.

Seventhly, improving the quality of life and strengthening international cooperation on green, clean and sustainable agricultural development associated with environmental protection, climate change adaptation in agricultural digital transformation in Dong Thap. Local authorities also constantly raise people's awareness through popularizing and education to renew thinking, unify awareness and action, environmentally-friendly lifestyle, green lifestyle. With the slogan “All for a wealthy community”. The province 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 energy, natural resources, the campaign to promote green life is one of the goals of developing green, clean, sustainable agriculture adapting to climate change and digital transformation in Dong Thap.

Comprehensive agricultural development towards a modern, efficient and high value-added agriculture. Building rural areas, increasing incomes and improving living conditions for people, strengthening capacity to prevent and mitigate the impacts of climate change, protecting and effectively, sustainably using natural resources, ensuring raw materials and environment.

Eighthly, in order 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-TTg dated January 28, 2022 of the Prime Minister approving the Strategy for Sustainable Agriculture and Rural Development for the 2021 - 2030 period, with a vision to 2050 and the Resolutions of the Provincial Party Committee, term XI, must promote the role of farmers in the development of green, clean, sustainable agriculture and digital transformation. It is necessary to approve and promote the role of Farmers' Associations at all levels, innovating contents and modes of operation, raising awareness, changing agricultural production thinking towards sustainability, diversifying agricultural products, and ensuring

productivity, quality, increasing economic value and ensuring food safety of farmers, by the effort of will, self-reliance, self-reliance to rise up, not expecting, not depending on, have to change the way of thinking, the way of doing, new awareness of position, role, status, capacity to master, comprehensively improving the material and spiritual life of farmers and rural residents.

Raising farmers' awareness about the role and importance of digital technology application in production, agricultural products on the market. This is a prerequisite for digital transformation in agriculture. Only when realizing the role and importance of digital transformation in agriculture can farmers actively learn and apply digital technology to agricultural production and business, creating the foundation for digital transformation in the agricultural sector of the province successfully.

Promoting communication and popularizing on mass media; organizing seminars, agricultural extension models on the need, role, and benefits of digital technology application in management, production and consumption of 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, large-scale commodity agriculture towards modernity, high added value and sustainability, affirming the role of the “pillar” of the economy, becoming a “measure of the province's level of sustainability”. Digital transformation is an important solution to help farmers and businesses produce quality agricultural products with the lowest costs and highest profits. This goal requires industries, localities and businesses and people to work together, unite and join hands, with the expectation of creating a breakthrough in productivity, quality and competitiveness for agricultural products, improving the lives of province's people.

Promoting the active role of Dong Thap farmers, participating in linkage models and collective economic forms in agricultural production “Agriculture follows Heaven's will”, “Green agriculture”, “Cooperative group, large sample field,” “Farmers' association”, “Four-house linkage model”, “Every farmer is a trader, every cooperative is a business applying digital technology”, smart farm, participating in domestic and global value chains, regrouping of lands, large sample fields, multi-value integration, interdisciplinary, regional connection, using effectively and sustainably the natural resources in association with environmental and ecological protection, building a chain of linkages, applying and mastering science - technology, intellectualizing for farmers to reduce costs, increasing quality, diversifying processing, creating a foundation for the birth of new-type

cooperatives, building smart villages, building green and clean agriculture, creating a brand associated with eco-tourism development, contributing to creating new value in production, ensuring the substance, going into depth, effectiveness, for the benefit of the people, and preparing to test the agricultural digital transformation and production management platform, supporting the safe management of production data, traceability; applying technology to administrative procedures in setting up, monitoring and automating data collection, processing and doing statistics through the application of remote-sensing technology; through IOT monitoring equipment, artificial intelligence algorithms to manage and warn of pests, natural disasters..., gradually opening people's participation in the agricultural digital transformation and production management platform, easily accessing to information on pest warnings, weather forecast, markets, scientific achievements, new technologies, automation and more efficient management of production processes, bringing agricultural products to consumers quickly, reducing intermediaries costs, improving competitiveness and production efficiency, building professional farmers to adapt to the digital and circular economy for the biggest goal that is income and farmers' living standards.

4. CONCLUSION

With the serious and catastrophic impacts of climate change, in order to ensure food security, develop green, clean and sustainable agriculture, the digital transformation of the agricultural sector plays a particularly important role in restructuring the agricultural industry, developing a concentrated, large-scale commodity agriculture towards modernity, producing quality agricultural products with the lowest cost, high added value, gaining the highest sustainable profit. This is a measure of Dong Thap's sustainability. Raising awareness to change the mindset of “*agricultural production*” to “*agricultural economy*”, shifting from a traditional agricultural area to digital agriculture, smart agriculture, green and environmentally friendly agriculture, the application of digital technology for “clean production”, “management and forecasting of diseases and natural disasters, risks, markets”, linking to create a product value chain between localities in the region, creating a breakthrough in productivity, quality and competitiveness for agricultural products not only in the short term but also in the long term, ensuring sustainable agricultural development.

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