

## ACTIVE RESPONSE TO CLIMATE CHANGE FOR SUSTAINABLE DEVELOPMENT IN MEKONG DELTA

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**ABSTRACT:** *The Mekong Delta is one of the regions in Vietnam that is facing great challenges in the development process due to climate change. Some extreme weather phenomena such as drought, salt-water intrusion etc. directly threaten the lives here. That fact requires the Mekong Delta to actively respond to climate change to achieve sustainable development. The article focuses on the challenges that climate change is posing to the Mekong Delta and proposes some solutions to cope with climate change for sustainable development in the Mekong Delta now such as: 1. Transforming the structure of livestock and plants to adapt to climate change for sustainable development. 2. Changing the mindset of development, specifically: change the mind from pure agriculture (mainly rice production) to agricultural economy (focus on quality and value chain); change the mind from chemical agriculture to organic and high-tech agriculture; attach processing industry and supporting industry to agricultural economic development. 3. Adjusting human behavior with nature to prevent climate change in the Mekong Delta today.*

**Keywords:** *Climate change, sustainable development, Mekong Delta*

### I. INTRODUCTION

The Mekong Delta - the largest granary in Vietnam is a region that plays a very important role in the overall national economy. With an area of about 4 million hectares, the Mekong Delta produces 50% of food production, 65% of fruit production, 75% of aquatic production and contributes 20% of GDP annually.

Agriculture and aquaculture are considered the two main economic "pillars" of the region. However, this key economic region is facing great challenges in the sustainable development process caused by climate changes. Therefore, proactively responding to climate change in the Mekong Delta is one of the key tasks to be solved next time towards the overall sustainable development.

### II. CONTENT

#### 1. Climate change is posing challenges to the Mekong Delta today

The Mekong Delta is considered to be a region, which is most heavily affected by climate change in Vietnam. In fact, in recent years, this area often faces extreme weather phenomena caused by climate change such as: high temperature, severe drought, salt - water intrusion, high tide, riverbank and coastal erosion etc. In this region, over 75% of people's livelihoods relate to agriculture and aquaculture. These two main production industries both depend heavily on natural conditions. The reality is posing big challenges for the socio-economic development and people's life here, specifically: Drought and salinity are causing heavy damage to agriculture, especially rice production in the Mekong Delta: "According to data from the Central Steering Committee for Natural Disaster Prevention, there are currently nearly 29,700 hectares of the 2019 season and Winter-Spring 2019-2020 crops in the Mekong Delta were damaged, faced the risk of losing everything. It is forecasted that in the coming time, the whole area will have about 332,000 hectares of winter-spring rice, 136,000 hectares of fruit trees will be likely to be

affected”<sup>1</sup>. This situation is also directly threatening the national strategy to ensure food security because the Mekong Delta is the source of over 50% of the country's annual rice production. According to data released by the General Statistics Office in early 2020: “By mid-March, the Mekong Delta has finished harvesting the 2019-2020 crop. Preliminary results show that planted area decreased by 2,500 hectares, and the productivity decreased by 0.9 quintals/hectares, output decreased by 26,600 tons compared to the same period last year”<sup>2</sup>.

The decrease in rice production in the granaries of the Mekong Delta also inevitably affects national rice export target in the near future: “On April 6, the Ministry of Industry and Trade proposed to the Prime Minister the rice output that could be exported in April - May 2020 of our country would be about 800,000 tons. The amount of exported rice was reduced by 40% compared to April and May 2019; down 35.7% compared to the same period in 2018 and down 21.7% compared to the same period in 2017”<sup>3</sup>.

Aquaculture - one of the key economic sector of the Mekong Delta is currently facing many obstacles due to the negative impacts of climate change. The increasing saltwater intrusion directly affects the aquaculture, especially the shrimp farming in brackish water areas. Besides, heavy rain, high temperature, high salinity have great impacts on the environment, health and growth of shrimp farmed in coastal areas, etc<sup>4</sup>. Climate change has caused mass death of shrimp, negatively affected the development of the key economic sector here.

Climate change with extreme weather phenomena such as drought, saltwater intrusion etc. not only affects production but also causes serious influence on the daily life in many Mekong Delta provinces. “According to statistics from 13 provinces in the Mekong Delta, due to drought and saltwater intrusion, the whole region now has about 82,000 households lacking clean water for daily life, etc. The number of households lacking fresh water for daily life is concentrated in many provinces, such as Ben Tre, SocTrang, KienGiang, Ca Mau and Tien Giang”<sup>5</sup>.

Moreover, landslides phenomenon is still ongoing and increasing directly threatening the lives, properties in this area. The workshop on solutions to deal with riverbank and coastal erosion in the Mekong Delta organized by the Ministry of Agriculture and Rural Development in Ca Mau on April 9, 2019 gave the following statistics: The Mekong Delta currently has 562 landslide spots with a total length of 786 kilometers and each year 300 - 500 hectares of land is lost. Landslide points in many provinces in these regions have been constantly increasing, typically such as in Dong Thap or Ca Mau provinces: “According to the Department of Agriculture and Rural Development in Dong Thap province, there were 101 kilometers of eroded riverbanks out of 123 kilometers of the Tien River running through this province. From 2005 to 2018, Dong Thap lost over 322 hectares of land due to water washing; over 8,000 households had to be relocated, and currently over 6,000 people lived in landslide-prone areas and needed to be relocated to a safe place. The leader of Ca Mau province said that from 2007 to now, Ca Mau had lost nearly 9,000 hectares of coastal protection forest due to landslides”<sup>6</sup>.

Climate change and extreme weather events have negative effects on production and people's lives in the Mekong Delta. As the result, many households in this place lose their homes, their livelihood. They can not live by farming (both agriculture and aquaculture). They are forced to leave their hometown to move to the city to look for work, which is increasing, causing population fluctuations and social safety. According to a recent study by Can Tho University, from 2010 to 2018, the Mekong Delta had about 1.7 million migrant workers to big cities to find works<sup>7</sup>. The fact shows that climate change with extreme weather phenomena are seriously affecting the production and life in the Mekong Delta provinces. That also has a direct impact on socio-economic development, especially sustainable development ensuring people's livelihoods and maintaining social security in this area. Therefore, one of the most important things is to propose solutions to proactively respond to the current climate change in the Mekong Delta. We have to minimize the consequences as well as turn challenges into opportunities for sustainable development. This has been confirmed in the Government Resolution No. 20/NQ-CP on sustainable development in

<sup>1</sup>SyHao: *Responding to climate change: A vision for drought and saline areas*, according to <https://baodantoc.vn/ung-pho-voi-bien-doi-khi-hau-tam-nhin-cho-lang-han-man-1582684678885.htm>, updated on February 26, 2020.

<sup>2</sup>SyHao: *Sustainable development of the delta before climate change: "Step together" for development*, according to <https://baodantoc.vn/that-trien-ben-vung-khu-vuc-dong-bang-truoc-bien-doi-khi-hau-buoc-cung-together-de-phat-trien-bai-2-1586439752768.htm>, updated on 9/4/2020.

<sup>3</sup>SyHao: *Sustainable development of the delta before climate change: "Step together" for development*, according to <https://baodantoc.vn/that-trien-ben-vung-khu-vuc-dong-bang-truoc-bien-doi-khi-hau-buoc-cung-together-de-phat-trien-bai-2-1586439752768.htm>, updated on 9/4/2020.

<sup>4</sup>Dang Phuong Mai: *Aquaculture in the Mekong Delta faces difficulties due to saltwater intrusion*, according to <https://ndh.vn/nong-san/nuoi-trong-thuy-san-tai-ong-bang-song-cuu-long-gap-kho-en-ngap-man-1098721.html>, updated on September 16, 2016.

<sup>5</sup>SyHao: *Responding to climate change: A vision for drought and saline areas*, according to <https://baodantoc.vn/ung-pho-voi-bien-doi-khi-hau-tam-nhin-cho-lang-han-man-1582684678885.htm>, updated on February 26, 2020.

<sup>6</sup>B. Phong (General): *Mekong Delta, challenges from climate change*, according to <http://daidoanket.vn/dong-bang-song-cuu-long-thach-thuc-tu-bien-doi-khi-hau-445306.html>, updated on August 21, 2019.

<sup>7</sup>SyHao: *Responding to climate change: A vision for drought and saline areas*, according to <https://baodantoc.vn/ung-pho-voi-bien-doi-khi-hau-tam-nhin-cho-lang-han-man-1582684678885.htm>, updated on February 26, 2020.

the Mekong Delta to adapt to climate change: “The Mekong Delta develops sustainably, safely, prosperity, on the basis of appropriate development of high-quality agricultural products. This is combined with services, eco-tourism, industry (focusing on processing industry, improving the value and competitiveness of agricultural products). The infrastructure system is planned and developed synchronously and modernly in the direction of being proactive, intelligent, adapting to climate change, ensuring safety against natural disasters. Natural resources are used rationally; biodiversity and cultural and historical traditions are maintained and embellished. The material and spiritual life of the people is enhanced”<sup>8</sup>.

## 2. Some solutions to respond to climate change for sustainable development in the Mekong Delta today

*Firstly, transforming the structure of livestock and plants to adapt to climate change for sustainable development.*

Agriculture and aquaculture are the two key economic sectors in the Mekong Delta. In order to adapt to climate change and minimize damage caused by extreme weather events, especially drought and salt-water intrusion, it is necessary to quickly change the structure of livestock and plants with specific measures such as: Quickly planning and developing agriculture in the Mekong Delta on the basis of biodiversity, a variety of crops and livestock that can adapt to a variety of climates and weather, especially drought and salt-water; Converting from 3 rice crops to producing 2 rice crops and 1 vegetable crop in spring-summer (early summer-autumn) in order to save water for irrigation and improve soil...; Promoting fruit trees (the strength of the Mekong Delta) towards the selection of salt-tolerant and drought-resistant varieties for high efficiency; Restructuring aquaculture in the direction of shifting from the cultivation of freshwater and brackish varieties to salt-water varieties etc.

In fact, many provinces in the Mekong Delta have applied these measures, proactively responding to climate change, and have minimized many risks caused by climate change to agriculture and aquaculture. They have even turned the risk (especially salt-water intrusion) to chances to develop livestock and plants. These varieties can adapt to drought and salt-water with high productivity. For example, in An Giang province, due to the promotion of production shifting towards reducing rice land, the area has been converted to prioritize fruit and vegetable crops in recent years. There are some concentrated vegetable areas, such as in Cho Moi district with nearly 700 hectares, Tri Ton district with 3,200 hectares etc. has helped the province's agricultural production value reach 183 million VND/hectare, 120 million VND/hectare higher than 2015. In Tien Giang province, in the 2019 summer-autumn crop, farmers grew vegetables on rice land and achieved a revenue of 143 million VND /hectare (earned of 88 million VND profit); watermelon planting revenue were harvested 169 million VND/hectare (earned 70 million VND profit). In this 2020 summer-autumn crop, Tien Giang has been encouraging farmers to continue converting to increase value. In Dong Thap province, in the 2019 summer-autumn crop, farmers converted rice land to grow purple sweet potatoes earned a revenue of about 200 million VND/hectare (earned 95 million VND profit); grew chili with a revenue of 418 million dong/hectare (earned more than 243 million VND). The profit is many times higher than palnting rice<sup>9</sup>.

However, converting livestock and plants to actively adjust to climate change in the Mekong Delta is still only a temporary and spontaneous solution of some provinces. There is no community link and specific strategy in the region. Therefore, it is necessary to have a long-term vision, a holistic approach and an integrated socio-economic development of the whole Mekong Delta region. We have to plan agricultural development, make conversion of plant varieties and livestock according to natural conditions and climate change at the specific local. The goal of the region project must be changed from "living with floods" to active behavior, economical and highly efficient use of freshwater resources, product exploitation of brackish and saltwater, fresh water security for people's daily life. We should not only solve the consequence, but actively turn extreme weather into opportunities to develop suitable livestock and crops instead of rice or traditional varieties.

*Secondly, it is necessary to change development thinking, specifically: changing the mind from pure agriculture (mainly on rice production) to agricultural economy (focus on quality and value chain); changing the mind from chemical agriculture to organic and high-tech agriculture; attach processing industry and supporting industry to agricultural economic development<sup>10</sup>. It is necessary to realize that, if we continue to develop agriculture*

<sup>8</sup>Government of the Socialist Republic of Vietnam: *Resolution No. 20/NQ-CP on sustainable development of the Mekong Delta to adapt to climate change*, November 17, 2017, according to <https://thuvienphapluat.vn/van-ban/tai-nguyen-moi-truong/Nghi-quyet-120-NQ-CP-2017-phat-trien-dong-bang-song-Cuu-Long-thich-ung-voi-bien-doi-khi-hau-367711.aspx>.

<sup>9</sup>PhuocBinh: *Converting crops to adapt to climate change*, according to <https://baocantho.com.vn/chuyen-doi-cay-trong-thich-ung-voi-bien-doi-khi-hau-a121916.html>, updated on 2/6/2020.

<sup>10</sup>Nguyen Hang: *Sustainable development of the Mekong Delta to adapt to climate change*, according to <http://tapchimoitruong.vn/pages/article.aspx?item=Ph%C3%A1t-tri%E1%BB%83n-b%E1%BB%81n-v%E1%BB%AFng->

in the traditional direction based on the exhausting exploitation of natural resources, breaking the laws of nature, climate change will certainly occur. Extreme weather phenomena will increase irreparably.

Thus, it is important to effectively respond to climate change for sustainable development in the Mekong Delta. We must radically change the development mindset, especially to shift the focus from agricultural production to increasing quantity to high-quality agricultural products that bring great value to farmers as well as contribute to the region economic development and national economy in general. We also switch from chemical agricultural production (using fertilizers, pesticides, chemical herbicides, etc. which are harmful to the environment) to developing organic agriculture with the use of eco-friendly auxiliary products followed VietGAP standards (including standards/regulations on good agricultural products (both agriculture and aquaculture)<sup>11</sup> in Vietnam; including principles, order and procedures to guide organizations and individuals to produce, harvest, and preliminarily process products to ensure safe products, improve quality products, ensure the welfare and health of producers, consumers and society; ensure environmental protection and product traceability) and GlobalGAP (a system of standards (a set of technical measures) on good agricultural practice developed for voluntary application to production, harvesting and post-harvest treatment for agricultural products (both agriculture and aquaculture all over the world)<sup>12</sup>. This standard helps agriculture and aquaculture to not only meet the requirements of the domestic market but also meet the requirements of the world market towards the expansion of the export of high quality agricultural products. It also requires to shift from traditional agriculture (increasing productivity by increasing the crop, not allowing natural resources, not regenerating land and water) to an adaptive agriculture according to natural, favorable conditions. This new way have to avoid rough interference in nature, develop sustainably under the motto of proactively living with floods, salinity, drought, lack of water in accordance with actual conditions etc. In order to implement the plan, it is necessary to apply scientific and technological achievements to agriculture as well as develop supporting industries (processing, preservation, transportation, etc.) to innovate friendly, efficient agriculture (rice production, fruit trees) and aquaculture - two key economic sectors in the Mekong Delta.

*Thirdly, adjust human behavior with nature to prevent climate change in the Mekong Delta today.*

The two solutions mentioned above are only solutions to help people be more proactive in responding to regular climate change to minimize the negative impacts on socio-economic development in the future. However, in order to thoroughly solve the problem, it is necessary to propose and implement solutions to adjust human behavior in the way of dealing with nature. In fact, scientists have shown that the basic cause of climate change in some regions in Vietnam, including the Mekong Delta as well as countries around the world is people's rough intervention with natural, inherent laws breaking to serve life and satisfy the needs of human beings.

The scientific assessment of the Intergovernmental Panel on Climate Change (IPCC) shows that the energy consumption due to burning fossil fuels (coal, oil, etc.) in energy production, industry, transportation, construction etc. contribute about half (46%) to global warming, about 18% deforestation, 9% agriculture, about 24% chemical manufacturing industry (CFC, HCFC), and the rest 3% from other activities<sup>13</sup>. Therefore, specific actions to limit and eventually eliminate climate change in the Mekong Delta are now directly related to the adjustment of human behavior with nature, such as: Prevent deforestation, actively plant and take care of forests, especially mangrove forests - the typical ecosystem of the Mekong Delta. Government Resolution No. 20/NQ-CP, November 17, 2017 on sustainable development of the Mekong Delta to adapt to climate change is affirmed that: "calling for the mobilization of all resources to protect, restore and plant new forests, especially the system of protection forests and mangroves, coastal, riverside; Efficient and economical use of energy (electricity, gasoline, charcoal, etc.) and resources (fresh water, forests, biological resources, minerals, etc.) in production and daily life; Limiting the use of fossil fuels (coal, oil, etc.) - the basic cause of global warming and looking for environmentally friendly alternative energy sources such as wind energy, solar energy, tides, etc. tides, etc. The 20th Government Resolution clearly states: "Minimize the addition of new coal-fired companies in the national electricity development planning in the Mekong Delta; step by step change technology for existing coal-fired companies towards modernity and friendliness to environment; focus on exploiting the potential of renewable energy like wind energy and solar energy"; transform the model of economic growth associated with sustainable development and environmental protection, etc.

<sup>11</sup> VietGAP new direction for Vietnamese agriculture: *What is VietGAP?*, according to <http://www.vietgap.com/1552/cm/vietgap-la-gi.html>.

<sup>12</sup> Wikipedia: *GlobalGAP*, according to <https://en.wikipedia.org/wiki/GlobalGAP>

<sup>13</sup> *Causes of climate change*, according to <http://iasvn.org/chuyen-muc/Nguyen-nhan-gay-ra-Bien-doi-khi-hau-3727.html>, updated on 11/12 /two thousand and thirteen.

### III. CONCLUSION

Thus, it can be affirmed that any global change will bring both advantages and disadvantages, opportunities and challenges for interest groups in the community. Scientists have proven that the impact of climate change with extreme weather events mainly brings disadvantages and risks to human life all over the world. Therefore, mitigation and proactive response and adaptation to climate change must be studied, proposed and implemented. The Mekong Delta in Vietnam is one of special region that is considered the most affected by climate change and the most vulnerable area in the world. So, it is becoming more and more important and extremely necessary to propose solutions to proactively respond to and adapt to climate change to limit and eliminate absolutely this situation. Proactively responding to climate change is also the most important way to sustainably develop in the Mekong River Delta where rice, vegetable, fruit crops, etc. and aquaculture mostly depend on natural conditions. Therefore, developing an action plan to adapt to climate change is both an immediate urgency and a long-term strategy to maintain sustainable socio-economic development as well as environmental protection in the Mekong Delta. This is certainly not a simple task and it requires a specific roadmap, appropriate steps and the coordination of stakeholders. Ministries, Departments and Branches in solving this problem.

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