AGRICULTURAL FARMING UNDER SOLAR POWER SYSTEM IN AN GIANG - BY NGUYEN SON TRA FOR SOCIAL IMPACT

MEKONG DELTA CLIMATE RESILIENT AGRICULTURE ACTIVITY DESIGN

LOCAL CONSULTATIONS SUMMARY REPORT

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ACRONYMS

COARAM	Coordination Office for Agriculture and Rural Affairs in the Mekong Delta
DPI	Department of Planning and Investment
FDI	Foreign Direct Investment
FGD	Focus Group Discussion
GHG	Greenhouse Gases
GVN	Government of Vietnam
KII	Key Informant Interview
MARD	Ministry of Agriculture and Rural Development
MPI	Ministry of Planning and Investment
MONRE	Ministry of Natural Resources and Environment
NGO	Non-governmental organization
USAID	United States Agency for International Development

INTRODUCTION

CONTEXT

The Mekong Delta encompasses the majority of southwestern Vietnam and is the country's largest delta. The region contributes more than half of the food production of Vietnam, with rice being the most important product, accounting for more than 90 percent of the country's agricultural export (Tay et al., 2022). The area is under significant threat from climate change, particularly sea level rise, putting the lives and livelihoods of the residents of the Mekong Delta at risk. However, agricultural production in the Delta is itself a large source of methane emissions, contributing to Vietnam's overall greenhouse gas output and aggravating the impacts of climate change in Vietnam and around the world (Thi et al., 2018).

In late 2017, the Government of Vietnam (GVN) promulgated Resolution 120/NQ-CP on the sustainable development of the Mekong Delta in the context of climate change. The resolution emphasizes the importance of enhancing the region's agricultural and aquacultural output while at the same time limiting the sector's contributions to climate change. USAID shares the GVN's ambition to sustainably develop the Mekong Delta while supporting Vietnam's commitment to reducing its GHG emissions by 8 percent by 2030 and to achieve net-zero emissions by 2050.

Reflecting these shared commitments, Vietnam's Ministry of Agriculture and Rural Development (MARD) and United States Agency for International Development (USAID) agreed to support a new activity on climate resilient agriculture to be implemented through 2027. The goals of this project are to reduce methane emissions from the agriculture sector, build resilience for the Mekong Delta's vulnerable communities, promote nature-based solutions, and draft complementary policies. As part of its efforts to design this new activity, USAID Vietnam tasked USAID Learns with conducting rapid consultations with a variety of key stakeholders, both within and outside of the Mekong Delta, to better understand the current issues facing climate resilience and agriculture in the Mekong, and to solicit ideas for the design process.

PURPOSE AND AUDIENCE

The purpose of this rapid consultation is to explore the perspectives of various stakeholders, including national and local authorities, farmers and cooperatives in the Mekong Delta, non-governmental organizations (NGOs) working in the region, and private sector representatives on areas of interventions that can generate the most impact to help the region to adapt to climate change. The study also reviews local efforts in combating climate change, highlighting good practices and models of nature-based solutions. The report will support the ongoing design process of the new USAID activity and should serve as a useful resource for the future implementing partner(s) at the outset of implementation.

KEY QUESTIONS

This study focuses on the following learning questions:

1. Who are the key actors shaping climate resilience in the Mekong Delta? What are they doing at present? What motivates their actions?
2. How are local people adapting and responding to climate change in the Mekong Delta?
3. Where is there existing momentum to achieve the target objectives?

METHODOLOGY

The study approach commenced with a rapid review of relevant documents to support an overall understanding of the region and its challenges. Following the desk review, the team conducted qualitative data collection, including site visits and observations, key informant interviews (KIIs), focus group discussions (FGDs), and participation in regional workshops. These are discussed in

more detail below. This report is intended as a narrative summary of the main findings presented in the Mekong Delta Climate Resilient Agriculture Report Presentation.

DOCUMENT REVIEW

Reviewed secondary documents included data on climate change, disaster history, and climate change scenarios in the Delta issued by Ministry of Natural Resources and Environment (MONRE) in 2021. Policy documents also studied include Resolution 120, Provincial Socio-Economic Development Plans, Mekong Delta Development Plans and Annual socio-economic reports issued by Fulbright University in Vietnam. In addition, scientific reports on water management, drought management, and flood management in the Mekong Delta were also consulted and analyzed for this report.

KEY INFORMANT INTERVIEWS

The study team conducted 19 KIIs with various stakeholders, including public officials at national and local levels, experts in the field, civil society organizations, private sector, and local communities living in the Mekong Delta. The interviews were conducted both in-person and online using Vietnamese with stakeholders in Hanoi, Ho Chi Minh, Can Tho, An Giang, Soc Trang, Bac Lieu, and Ca Mau. The study team was careful not to duplicate interviews USAID had recently conducted itself during separate visits to the Mekong Delta in mid-2022.

The detailed number of respondents disaggregated by affiliation and geography can be found in Annex II. A consent statement and interview question list were also prepared to ensure that the interviews are voluntary, and data collected from these interviews are only used for the purpose of this report. Further information about interview questions and the consent form template can be found in Annex III. All interviews are noted in written scripts and coded to anonymize the identity of the respondents for their privacy.

FGDs

To supplement the KIIs, the study team also conducted FGDs with relevant stakeholders, including government authorities, regional experts, and local communities. In total, the team completed four FGDs with 11 individuals in total. All FGDs were conducted in person using Vietnamese as the medium of the discussion. The study team used the same set of questions and consent form from the KIIs but tailored to fit the objectives of the discussion and the relevance of stakeholders to the interview questions. All FGDs were either recorded or noted with scripts, then these scripts were also coded as anonymous to protect participants' privacy. The detailed list of stakeholder groups, questions, and forms used for FGDs can be found in Annex II and III.

DIRECT OBSERVATION

The study team also visited a nature-based embankment solution from a previous project, as well as the transformation to concrete embankment areas in Can Tho city. These sites were visited to provide a direct comparison between an engineered solution and a nature-based solution in responding to climate change in the area. The observations also reflected the trends and direction of local authorities and other funders on building infrastructure for climate change adaptation in the area.

The study team also visited a 50 hectare (ha) area of mangrove forest in Vinh Chau, Soc Trang. This area is grown and managed by the local community through the Hanh Phuc Xanh project implemented by Song Foundation. The project aims to establish a green corridor along the coastline of Vietnam to reduce the impact of climate change, regulate water flow, and protect water resources in the area.

WORKSHOP

The study team also participated in two workshops to seek the opinions and perspectives of different experts and stakeholders working on projects related to climate resilience in the Mekong Delta. These workshops were also opportunities for the study team to search for local efforts and solutions to adapt to climate change in the region. The first workshop, organized by Ca Mau Provincial People's Committee, was titled "Adapting to Climate Change in the Mekong Delta." The second workshop, co-organized by Nguyen Tat Thanh University and Vietnam National University - Institute for Circular Economy Development, focused on the topic of "Social-Economic Development of the Mekong Delta region in the context of Climate Change." The scripts from keynote speakers sharing and discussions with other stakeholders in these workshops were recorded as the input for this consultation report.

LIMITATIONS

This study was conducted in a short period of time at the end of the year; some relevant stakeholders were unable to meet with the study team due to scheduling conflicts, making it difficult to arrange interviews in some cases. Additionally, some public officials do not wish to discuss questions with sensitive elements, so information may not be fully shared by stakeholders from government agencies and provincial officials.

FINDINGS AND CONCLUSIONS

1. CLIMATE CHANGE OVERVIEW AND IMPACTS

The Mekong Delta, located in the southernmost part of Vietnam, has a tropical monsoon climate, with two seasons (rainy and dry), high temperatures, and relatively heavy rainfall. The average temperature is around 26 - 27°C, ranging from 23 - 24°C to 31 - 32°C at different points in the year. Average temperatures have increased by about 0.8-1.1°C from 1958 to 2018 and may increase by a further 1.3°C in the 2046 - 2065 period (MONRE 2020). In addition, average rainfall from 2010 to 2018 was 1,791 mm, with the rainy season typically lasting from March until November; however, MONRE projects that average rainfall may increase by around 15 percent by 2060 (MONRE 2020). These changes are already having significant impacts on the livelihoods of the people of the Mekong Delta, and they are likely to worsen as climate change continues.

Sea level in the Delta has risen by 4.2 mm each year on average, contributing to rising salinity and flooding levels, which in turn is reducing crop yields and forcing changes in agricultural livelihoods. Over the longer term, with one meter of sea level rise by 2100, about 39 percent of the entire Mekong Delta would be inundated with water, with coastal provinces the most affected (MONRE 2020). Nearly all forest lands in Cu Lao Dung, Tran De in Soc Trang province, and Ngoc Hien in Ca Mau province are at risk of flooding due to sea level rise. This would have a significant impact on economic conditions, migration trends, biodiversity, and public health.

Figure 1: Natural disasters and extreme weather in the last 10 years in the Mekong Delta (source: consultation interviews)

Type of disaster/ extreme weather/ Environmental incidents	Downstream region (East Coast and West Coast)			Upstream region (Long Xuyen quadrangle)		
	Level of frequency	Level of damage	Future level of risk	Level of frequency	Level of damage	Future level of risk
Saltwater Intrusion	High Level	High Level	High Level	N/A	N/A	N/A
Drought & Water shortages	High Level	High Level	High Level	High Level	Medium Level	Medium Level
Prolonged heatwave	High Level	Medium Level	Medium Level	High Level	Medium Level	High Level
Extreme rain (unseasonal, local heavy rain)	High Level	High Level	High Level	High Level	High Level	High Level
High tide/Inundation	High Level	High Level	High Level	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	Medium Level	Low Level	Low Level
Coastal erosion	High Level	High Level	High Level	N/A	N/A	N/A
Riverbank erosion	High Level	High Level	High Level	High Level	High Level	High Level
Tornado/ Thunderstorm	Medium Level	Medium Level	Medium Level	Low Level	Low Level	Low Level
Land subsidence	High Level	High Level	High Level	N/A	N/A	N/A
Storm and tropical depression	Medium Level	High Level	High Level	Low Level	Low Level	High Level

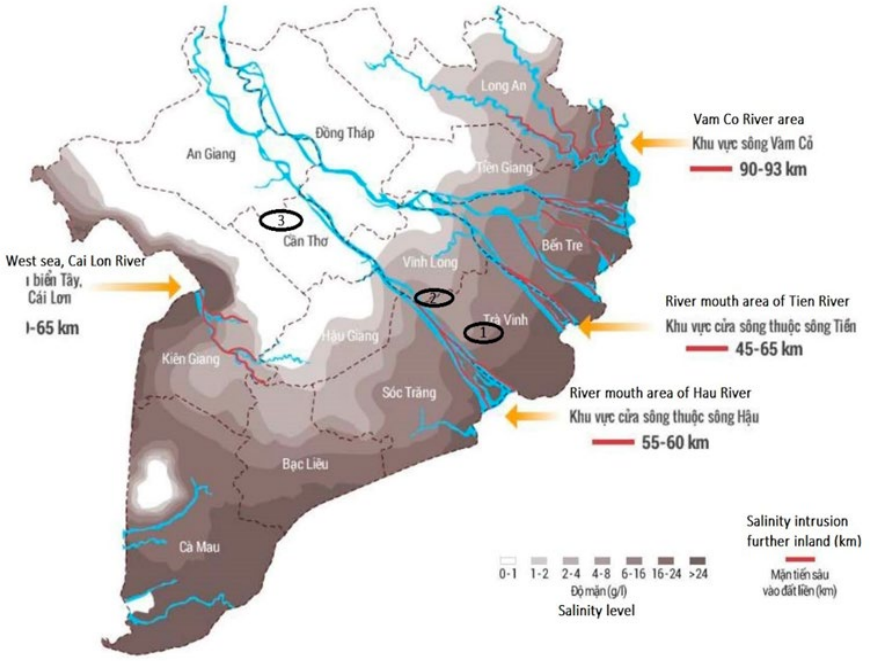
Disasters and extreme weather events are becoming more common. In particular, the region faces high levels of saltwater intrusion, drought, prolonged heat, unseasonal or extreme rain, high tides/flooding, tornadoes/lightning storms, riverbanks, and coastal erosion. Storms and tropical cyclones rarely occur in the region, but risk of this activity is increasing as weather patterns in the south of Vietnam shift. Figure 1 above shows a summary of informant perspectives on climate issues. The most significant of these issues are discussed in greater detail in the following sections.

Saltwater intrusion and drought are occurring more regularly on a larger scale and are progressively moving toward the inner fields. This trend is driven by rising sea levels, low-lying

terrain, and low flood water in the dry season. In addition, strong winds produce higher tides, forcing saltwater from the East Sea into coastal rivers and canals. Drought and saline intrusion create significant pressures on the availability and use of freshwater, as many farmers in the Delta rely on freshwater to produce agriculture, leading to overuse of groundwater and crop failures. Salinity and weather patterns are not uniformly well monitored across different communities in the Delta; some communes have their own irrigation and monitoring systems in place, but this is not widespread.

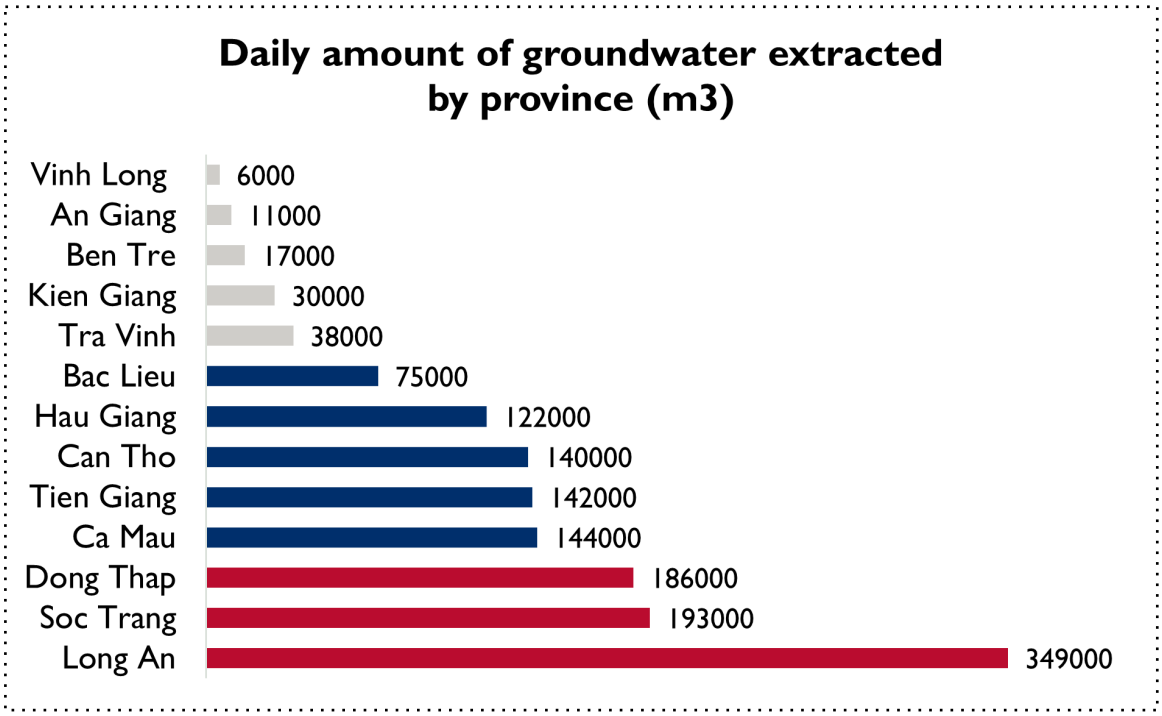
Between 2010 and 2020, the Mekong Delta recorded two extreme and lasting saltwater intrusion waves, in the dry seasons of 2015 - 2016 and 2019 - 2020. The 2015 - 2016 saltwater intrusion wave affected seven of the 13 provinces in the Delta. To take only the province of Soc Trang, the total recorded damage was worth about 640 million VND, including damage to more than 31,000 ha of rice, crops, fruit trees, and aquaculture. More than 24,000 ha of rice and 6,000 ha of sugarcane were reduced in productivity, ranging from 30 percent reductions in output to a complete loss. The recorded damage in 2019 - 2020 was 1,000 ha of Winter-Spring rice, with productivity reduced by 30 – 70 percent.

Figure 2: Salinity intrusion map in the Mekong Delta in 2016 (Tien Dung Khong, 2019)



Drought becomes more serious when conflicts occur between water use for agricultural production versus water use for living in the Mekong delta during dry season. Overuse of freshwater for the rice crop at upstream areas in the dry season has led to a shortage of water supplies for household use, livestock, and for fruit tree management in downstream provinces. Downstream residents tend to drill wells to extract groundwater, a practice that commenced about twenty years ago with increasing river pollution and salinization and has grown significantly in the years since. Figure 3 below details the amount of groundwater being extracted in each province in the Mekong Delta. These dynamics are discussed further in Section 2 below.

Figure 3: Water extraction volume in the provinces of the Mekong Delta (Southern Institute Of Water Resources Research, 2021, unpublished research offered during consultations)



Unseasonal and heavy rain is another significant climate challenge. Several years between 2011 and 2022 recorded unseasonal rainfall, particularly prolonged heavy rains occurring at the end of November, causing damage to rice and shrimp farming. Pests and disease are known to increase in both rice and shrimp farms during periods of excessive rain, threatening yields and contributing to an overuse of pesticides.

Erosion and landslides are another key issue facing the region. About seven million tons of sand are deposited into the Delta each year, while mining operations in low-lying areas extract around 28 million tons, and another 6.5 million tons is pushed into the sea (WWF, 2021). High demand for infrastructure development across Vietnam, mainly for ground leveling, is the primary driver of over-mining. Sand is also used for construction purposes with no other suitable alternative materials. The overexploitation of sand and the lack of alluvium flowing from upstream has caused more than 600 landslides in the Mekong Delta. Large-scale landslides result in the loss of productive land, bursting of embankments and dikes, and road erosion, all of which can disrupt the logistics chain for agricultural production and trade in the region. Sand exploitation from riverbanks also causes land subsidence at nearby areas and destruction of homes.

In addition to natural disasters and climate change, the study found that **soil, air and water pollution are increasing**. Agricultural and municipal waste, particularly single-use plastics, are contributing to the buildup of waste in the region. Water pollution is predominantly caused by shrimp farming, untreated domestic and industrial waste being discharged into rivers, and the excessive use of pesticides and fertilizers. Air pollution from waste incineration is another important challenge. Each of these forms of pollution are negatively impacting biodiversity in the region and threatening public health.

2. GOVERNANCE ISSUES AND RESPONSES IN THE MEKONG DELTA

This section explores the main questions posed in the terms of reference: exploring briefly some of the main actors shaping climate and agriculture issues in the Mekong Delta, drivers of behavior, and local responses to key challenges.

2.1. OVERVIEW OF KEY ACTORS AND ROLES

There are two ministries most significantly involved in climate-related policy and water and land management in the Mekong Delta: **the MONRE and the MARD**. Other entities within the GVN play important roles as well, including the Ministry of Planning and Investment (MPI), responsible for development of inter-provincial and intersectoral policies; the Ministry of Industry and Trade, which manages hydropower in the upper Mekong; the Ministry of Health, which manages the quality of domestic water; and the Ministry of Construction, which manages the water supply in the urban area. MONRE and MARD also oversee functions concerning management of water resources, water pollution, reserve assessment, and disaster risk management related to water sources.

Provincial governments oversee local climate and environment issues and oversee departments that correspond to the ministerial level entities described above. Provinces are also able to enact policies at the local level affecting their boundaries. The dialogue mechanism between stakeholders on climate, land and water resource management is through the Department of Planning and Investment (DPI) and the Provincial People's Committee. The departments usually independently synthesize and submit evidence and data to the DPI every five years as socio-economic planning activities are underway.

Vietnam also has a wealth of climate scientists and research institutes, many with a specific focus on the Mekong Delta. These include:

- Can Tho University: fisheries research, livelihoods, and climate change adaptation solutions.
- An Giang University: rice research.
- Southern Institute of Water Resources Research: water resource management issues and irrigation planning models.
- Fulbright University Vietnam: economics and policy issues.

Private companies in the agricultural sector play a very important role in the economy of the Mekong Delta. Large companies are key actors in providing technical and financial support in forms of training and supplying agricultural inputs for farmers. The support is part of the collaboration agreement between the companies and farmers, where the farmers commit to follow certain standard farming practices guided by the companies as a means to get a buy-back agreement. In this way, farmers can warrant the output and price for their products while companies have stable supply at the standard they require. The two largest companies in the agriculture sector in the Mekong Delta are Minh Phu in the shrimp value chain and Loc Troi in the rice value chain. Foreign direct investment (FDI) companies also have an important role in agricultural food processing, export, and particularly investment in high-tech, non-traditional farming. However, the Mekong delta in particular and Vietnam in general have not yet attracted enough FDI companies to make a breakthrough in the agricultural sector. Specifically, in 2020, FDI into agriculture (agricultural, forestry and fishery products) is 3.5 billion USD, accounting for only 0.97 percent of total FDI into Vietnam. The main reason is the barriers for FDI enterprises to access agricultural land to build stable raw material areas; logistics support services and infrastructure for agricultural production are still limited. There are also thousands of small and medium sized companies actively work in the agriculture sector in the Mekong Delta

Exports of agricultural products from the Mekong Delta

According to the Vietnam General Department of Customs, Vietnam's rice exports in 2021 have reached 6.24 million tons, worth nearly 3.3 billion USD, with an average export price of $526.90/ton, of which the Mekong Delta contributed 95 percent of rice products for exporting. Asia is the largest regional export market, reaching nearly 4.3 million tons, accounting for 68.62 percent of total exports, with the Philippines being the largest export market, reaching about 2.46 million tons, accounting for 39.33 percent of the total export volume, and China ranking second, reaching 1.06 million tons, accounting for 16.9 percent of total exports. Africa is the second largest regional export market, reaching 1.25 million tons, accounting for about 19.89 percent of total exports.

The Mekong Delta contributes 70 percent of export fruit products, particularly dragon fruit, durian, and citrus trees. In 2021, China is Vietnam's largest fruit consumption market with a proportion of 53.7 percent, equivalent to a turnover of $1.91 billion, followed by the US market with $222.9 million, accounting for 6.3 percent; Korea with $157.4 million, Japan with $153.2 million, the European Union with $150.7 million, and Thailand with $147.3 million.

Vietnam's seafood export turnover in 2021 has reached US$8.88 billion, of which the Mekong Delta contributes 65 percent. The US is Vietnam's largest shrimp export market with a turnover of 1 billion USD per year, followed by Europe, Japan, Korea, and Australia. Exports of Catfish, all of which are raised in the Mekong Delta, in 2021 reached over $1.6 billion, an increase of 10 percent over the previous year. The main markets for catfish exports are the US, China, and Europe.

2.2. IMPLEMENTATION AND COORDINATION CHALLENGES

Coordination among the government agencies on climate and disaster risk issues is often weak, leading to implementation issues. Climate change resilience policies in Vietnam are not well equipped to address climate impacts. At the national level, the MPI develops regional strategies, and MONRE issues policies on climate change adaptation, but the specific projects are overseen by MARD. MARD is responsible for irrigation and construction of dikes and embankments. However, MONRE also implements some technical projects for climate adaptation as they are in charge of NAP. Each of these ministries have their own functions and mandates guiding their actions within this system, with collaboration not promoted or enabled. Furthermore, government action in the Delta may be driven by wider interests or concerns not linked to local development goals. For example, the encouragement of the Ministry of Transportation on mining sand from the coastal area to meet the demand for sand for infrastructure projects elsewhere in Vietnam may worsen local climate and agriculture issues in the Delta.

Many local officials are also unaware of key climate policies and programs and do not take sufficient action to promote new approaches to agriculture. The Resolution 120 emphasizes the application of adaptation solutions in harmony with nature. However, when being asked about the proposed priorities for climate change adaptation, provincial officials from the natural resources and environment sectors and the agriculture sector in Soc Trang province wanted more dikes to prevent saltwater intrusion, irrigation works and concrete embankments to prevent erosion. In fact, several local officials and individuals contacted for this study were unaware of Resolution 120 even after five years of implementation. Investment for climate change measures from the central government and even international donors still have an infrastructure focus. For the central government investment, the Cai Lon - Cai Be irrigation system in Kien Giang is an example. Regarded as the biggest of its kind in Vietnam, this irrigation system is intended to control salinity in the five provinces of Ca Mau, Bac Lieu, Soc Trang, Hau Giang and Kien Giang. The construction of the first phase began in November 2019 with total investment capital of over 3.3 trillion VND ($144.48 million). For international donors, the World Bank has a project on Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods, with a budget of $387 million. A large amount of the budget is allocated for concrete dykes and embankments to protect the core area of Can Tho city. It is important to mobilize the resources and investment to effectively implement Resolution 120 on the ground.

Weak coordination also impacts inter-provincial issues, with downstream provinces often bearing the brunt of the challenges. For example, the operation of water resource management in the Long Xuyen Quadrangle, in the northwestern area of the Mekong Delta, has a great influence on water resources downstream. However, the Delta provinces do not have an effective mechanism for exchanging data or sharing common plans on water issues. Similarly, provincial governments have the power to make decisions on sand mining within their territories, but there is no inter-provincial plan for sand mining in the region, making the issue more difficult to manage as it impacts river flows. To the contrary, one interviewee said that the Delta currently has 13 "kings" making independent decisions for their own province, without consideration of their wider impacts.

International coordination on issues affecting the Mekong River is especially poor. Notably, China does not regularly share data on upstream hydropower dams that impact the Mekong Delta, while the Mekong River Commission, the inter-governmental body responsible for managing cross-border water issues, has very little power to act against regional dam construction. Local authorities and communities in the Mekong Delta are unable to challenge these dynamics effectively as they play out in diplomatic spaces.

Disaster prevention and control policies also suffer from similar issues, including low awareness and capacity, even amongst members of local steering committees. The study team found that local resources for disaster prevention and control are minimal; local rescue and first aid capacity is weak; and relocation and evacuation plans are hampered by vulnerable infrastructure. New technologies to alert local communities to disaster risks are underutilized, and many remote areas are poorly covered by loudspeakers and radio infrastructure.

Climate information and weather forecasting services in the Mekong Delta are still very limited. At present, there is no information on climate services being provided for the Mekong Delta region. In 2020, MONRE has updated the climate change scenario to the end of the 21st century for the whole country, including the Mekong Delta. However, there is currently no service to provide climate information at the provincial level.

Regarding weather forecasting, the National Center for Hydrometeorological Forecasting is responsible for providing seasonal and daily forecasts for the entire Mekong Delta region through its website, while the Southern Regional HydroMeteorological Center provides daily forecast to the provinces by daily reports, fax and through mass media such as radio and television. According to people's feedback, the forecast information is still very general for the whole province, but there are no detailed forecasts to the district level.

Cooperation between research institutions is also sporadic, as is engagement between these institutions and local authorities. This is largely because many research projects are donor-driven and time-limited and may be poorly linked to local policy planning processes, hindering their uptake and replication. There is also **limited cooperation between businesses and the government**. Business leaders were only invited by MONRE to contribute to the national climate change adaptation plan for the first time in 2019. Private sector contributions to these plans are often weakly defined or implemented.

2.3. LOCAL RESPONSES AND ADAPTATIONS

In the absence of consistent messaging or support from local authorities, **farmers must make choices that may suit their individual needs at the expense of neighboring communities**. Interviews in Ca Mau and Soc Trang indicated for instance that many farmers have switched from an intensive rice model to a rice-shrimp or a mangrove-shrimp[1] model out of necessity, but without consulting neighboring agricultural activities or wider planning priorities. Such changes create conflicts between rice and shrimp farmers: the latter must pump salt water into shrimp ponds to encourage aquaculture development, but this in turn raises the salinity of neighboring rice fields, threatening their output. Rather than supporting farmers to jointly make such decisions, the government considers such unilateral changes to be a violation of the law, restricting the space for more effective local coordination and decision making.

As noted above, the **application of pesticides in agriculture is also on the rise in the Delta**, to the point that some local stakeholders considered the region to be "addicted" to them. With weather and temperature patterns becoming increasingly erratic, pests and crop diseases thrive, causing people to use more pesticides to ensure stronger crop output. Local officials do not

[1] IUCN (2016), Scaling up integrated mangrove-shrimp farming in the Mekong Delta, Vietnam, https://www.iucn.org/news/viet-nam/201611/scaling-integrated-mangrove-shrimp-farming-mekong-delta-vietnam

encourage this level of overuse but have no mechanism to prevent it. However, overuse can reduce the quality of products and cause water pollution along the Mekong River. As with other issues discussed above, negative impacts are not shared consistently across the Delta: pesticides used upstream pollute water systems in downstream provinces.

Borehole drilling for groundwater extraction is also reaching extreme levels. Almost all downstream households as well as many in upstream areas have constructed these wells for household use and crop production. Increasingly, the wells must be dug much deeper, up to around 150 meters, to access adequate groundwater sources. This creates a vicious cycle for Delta farmers and households: digging wells may temporarily help locals to access water in the dry season, particularly where local river systems are polluted or highly salinated, yet drilling also causes land subsidence, damaging infrastructure and housing and increasing the risk of high tide flooding in the future. The response is inconsistent: only Ca Mau province has issued policies on groundwater management. In the absence of robust, inter-provincial water management practices, local households will continue to use these resources to their short-term advantage in the face of climate impacts.

More broadly, migration out of the Delta is increasing, with people of all ages relocating to other parts of Vietnam in search of more viable livelihoods. Young people are increasingly moving out of the Delta in search of better economic opportunities; some localities have much larger populations of older and very young people as working age individuals have left for industrial zones in Binh Duong and Dong Nai. Many young people returned to their hometowns during the COVID-19 pandemic, but this was largely temporary, with most returning to their normal places of work within three to five months. More broadly, concern is growing that the Delta will have a shortage of high-quality agricultural labor in the next 10 years. There are also reports that elderly individuals are also relocating in search of work as they do not receive adequate support from public social programs to sustain themselves.

There is **some reason for optimism** as farmers make more proactive adaptations to respond to climate change. These include:

- Shifting to the rice-shrimp model
- More closely monitoring weather and climate forecasts, where they have the ability to do so
- Improving seasonal planning and intensive farming approaches
- Better capture and storage of freshwater for use during the dry season
- Registration with provincial government to participate in new agricultural models
- Shifting to organic farming, with support from private businesses

In certain localities, climate programming is aligning more with nature and relying less on hard infrastructure. This latter approach, promoted heavily throughout the Delta, is typified by the construction of several high dykes in upstream areas, which impacts biodiversity, shifts challenges to downstream areas, and creates new water-related threats and uncertainties. Some local officials, newly aware of these issues, now increasingly prefer integrated, softer approaches making use of nature and taking better account of the local context. Local and international organizations have contributed significantly to this shift in perception – for example, the World Wildlife Fund's work to raise awareness on sand resource management; United Nations Development Programme's and International Union for the Conservation of Nature's work on biodiversity conservation; and Oxfam's efforts to mainstream gender into value chains.

However, impacts from local programming are not widespread, as lessons learned are not typically incorporated into the national policy process, nor are they taken up through local government programming. Many stakeholders working on local projects promoting nature-based solutions feared their impacts unraveling once their project ends and funding is complete. One example explored in this study is a green embankment along the Cai Son river in Can Tho. This embankment, constructed with green trees since 2013, had the ability to protect an important riverbank at a low cost. However, this embankment was later demolished to make way for a

concrete embankment constructed with funding from the World Bank. The reason is that the green infrastructure solutions were not mentioned in public procurement guidelines, and local officials were unable to develop appropriate bidding documents without this guidance. As a result of these bureaucratic issues, government funded and operated green infrastructure is rare in the Delta. This is an area for USAID to support the Central Government to integrate the nature-based solutions into the National standards in infrastructure.

3. EXISTING MOMENTUM AND OPPORTUNITIES FOR USAID

USAID is already building on **existing momentum through its positive relationship with MARD and other stakeholders**. These key stakeholders are engaged in the design process and are pushing for its success. It is also apparent from the consultations that there is demand for the new activity's proposed interventions. Communities also appear to be engaged in climate issues and willing to make personal contributions to address them. This suggests that USAID is likely to find willing partners across the Delta. However, some of the critical questions that may arise in implementation include:

- Can the activity support local and central policymakers to collaborate effectively on regional issues?
- What might incentivize the adoption of new and innovative solutions to climate resilient agricultural development?
- Can the activity support incorporation of the lessons from smaller scale interventions and pilot schemes into policy and regulation, for example on green infrastructure?

The consultations raised a number of potential opportunities and recommendations for the activity to take forward. These are discussed below.

3.1. OPPORTUNITIES AND RECOMMENDATIONS

First, the new activity should consider **working closely with the Coordination Office for Agriculture and Rural Affairs in the Mekong Delta (COARAM),** established by MARD in March 2022. COARAM is responsible for coordinating actors and policy development efforts in the Mekong Delta on the agricultural economy. The Office is also intended to support production planning, irrigation development, engagement with cooperatives, and enterprise development. Importantly, the Office is tasked with coordination of internationally funded projects working across provinces or regions of Vietnam, potentially suggesting it could be a key stakeholder for project approval and oversight. Given the Office's mandate and connections to MARD, COARAM could also serve as a useful partner in the development of policy interventions and in improving inter-provincial coordination on climate issues.

The GVN is also interested in **improving the value chains of different agricultural products** considering new cultivation models in the Delta, as Resolution 12-NQ/TW of 2022 suggests. Such improvements will require consideration of climate impacts and better integrated planning of adaptation and infrastructure development. Larger domestic private companies, small- and medium-size enterprises and FDI companies are important to provide relevant technology and training opportunities, or to launch smaller pilot projects in agriculture. In addition, it is possible to pilot FDI enterprises to associate with farmers and cooperatives to rent land for agriculture production. The new activity could work with local and central government actors to integrate the lessons of these efforts into provincial agricultural development planning procedures, and support scale up where possible. The activity may also be able to support complementary research outputs on the climate impacts of value chain development and suggest alternatives solutions as needed.

New approaches to **erosion management using nature-based and community-based solutions** have been piloted in the peri-urban area of Can Tho. The study team visited a project funded by the Rockefeller Foundation and managed by ISET that uses a collective action approach to bring together local organizations, district-level authorities, academics, and community members.

These stakeholders work together through a community board to identify issues in riverbank erosion and to implement possible low-cost solutions. One such issue was the lack of provision for nature-based solutions in its infrastructure policies, which meant that these solutions could not be required in local procurement. The community board decided to implement natural barriers on riverbanks to test the approach and demonstrate its effectiveness; over two kilometers of riverbank embankment has been constructed through the project. The model, though limited in scale, suggests that there is an interest in the community co-management of infrastructure, including amongst community members, if they are well targeted and given meaningful roles in the process. It is also essential to work with local and central authorities to learn from these projects - and indeed others conducted in the region - and scale up successful initiatives, including through policy reform if needed.

The research team also reviewed **ongoing community mangrove management projects** in Cu Lao Dung and in Vinh Chau and Soc Trang managed by Song Foundation, a local organization. Local organizations trained local people on the importance of mangroves in cultivating aquatic resources and protecting their coastline from erosion, which encouraged more effective management. The Soc Trang Department of Agriculture and Rural Development promoted this community engagement and shared details on government plans for mangrove development. 50 ha of mangrove land has been planted in Soc Trang, funded by crowdfunding through Song Foundation, with an additional 80 ha to be planted. To increase the value of mangrove forest to local livelihood and sustainable development, organic shrimp farming under the mangrove canopy has been applied in Soc Trang, and also commenced in Ca Mau and Bac Lieu. To scale up this community engagement to other parts of the Delta, the new activity could explore lessons from forestry management projects, including applying a payment for forest services scheme to mangroves, enabling communities to profit from forests and incentivizing their development and protection.

The new activity should also consider the following recommendations generated through engagements with local stakeholders in the Mekong Delta. Further details are found in the main report.

Water governance and land use management:

- Establishing an inter-regional water resource and land use management committee, engaging MONRE and representatives of the Provincial People's Committees along the Mekong River.
- Building a water source monitoring system including biological, chemical, and physical indicators. Monitoring results should then be publicly posted on technology platforms for public access.
- Support initiatives to capture rainwater at the community level and to promote economical use of water in the community.

Agriculture value chains:

- Work with farmers to adopt agricultural practices that reduce the need for chemical pesticides.
- Scaling up access to weather forecasting and climate services technology to farmers.
- Support development of value chain (rice, shrimp, fruit) quality standards and sustainable markets.
- Support technology and digital transformation in product traceability.
- Support restoration of indigenous crops and livestock varieties.

GVN stakeholders
- MONRE
- MARD
- People's Committees of provinces

Local implementing partners
- Local NGOs
- Rep of local communities and CSOs

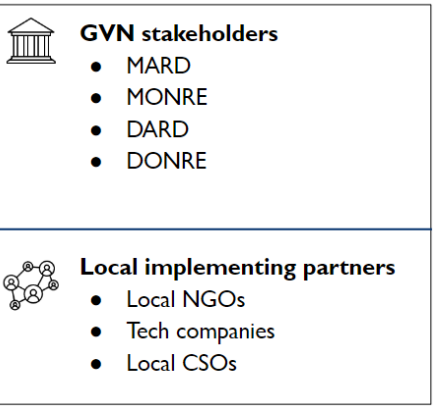
GVN stakeholders
- MARD
- DARDs

Local implementing partners
- Can Tho University
- An Giang University
- VCCI
- Private sector companies
- Climate service companies

- Promote the use of renewable energy on shrimp farms.

Nature based solutions:

- Support initiatives on community-based planting and protecting mangroves in downstream areas (particularly Soc Trang and Bac Lieu).
- Work with central and local governments to develop a policy of payment for forest environmental services for mangroves.
- Assessment of the carbon storage potential of mangroves for carbon certification.
- Work with communities and local authorities to apply nature-based solutions to erosion management.
- Improve the management of sediment extraction activities so that they are more sustainable (e.g. identifying areas where the impact of extraction might be lower, or providing guidance on sustainable extraction limits).



ANNEX I: REFERENCES AND REPORTS UTILIZED IN DESK REVIEW

T. Dung Khong, A. Loch, M.D. Young, Perceptions and responses to rising salinity intrusion in the Mekong River Delta: what drives a long-term community-based strategy?, Science of the Total Environment (2019), doi: https://doi.org/10.1016/j.scitotenv.2019.134759

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Ministry of Nature and Environment, 2020, Climate Change Scenario in Vietnam http://www.imh.ac.vn/files/doc/2020/KB percent20BDKH percent202912.pdf

Vietnamese Government, Resolution No.120/NQ-CP dated November 17, 2017 of the Government on sustainable and climate-resilient development of the Mekong River delta.

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Tay Ru Hui, Edward Park, Ho Huu Loc, Pham Duy Tien, Long-term hydrological alterations and the agricultural landscapes in the Mekong Delta: Insights from remote sensing and national statistics, Environmental Challenges, Volume 7, 2022, 100454, ISSN 2667-0100, https://doi.org/10.1016/j.envc.2022.100454

Thi Bach Thuong Vo, Reiner Wassmann, Agnes Tirol-Padre, Van Phuong Cao, Ben MacDonald, Maria Victoria O. Espaldon & Bjoern Ole Sander (2018) Methane emission from rice cultivation in different agro-ecological zones of the Mekong river delta: seasonal patterns and emission factors for baseline water management, Soil Science and Plant Nutrition, 64:1, 47-58, DOI: 10.1080/00380768.2017.1413926

IUCN (2016), Scaling up integrated mangrove-shrimp farming in the Mekong Delta, Vietnam, https://www.iucn.org/news/viet-nam/201611/scaling-integrated-mangrove-shrimp-farming-mekong-delta-vietnam

ANNEX II: FULL LISTING OF PERSONS INTERVIEWED

DATA COLLECTION RESPONDENTS			
AFFILIATION	RESPONDENT TYPE	TOOL	NUMBER OF RESPONDENTS
CAN THO			
Economic Board for South Western of Vietnam	Former staff	FGD	1
Can Tho University	Current staff	FGD	2
Hong Ngu rice company	Director	FGD	1
RECERD	Current staff	FGD	2
No affiliation	Expert	FGD	1
AN GIANG			
Center for Agricultural Technologies and Services	Current staff	KII	1
Nui Voi Rice Cooperative	Farmer	KII	1
Office of Tri Ton Agriculture and Rural Development.	Current staff	KII	1
SOC TRANG			
Hanh Phuc Xanh Mangrove Forest Project - Song Foundations	Collaborator	FGD	2
Soc Trang Department of Agricultural and Rural Development	Current staff	KII	1
Shrimp Farm	Farmers	FGD	4
HANOI			
Ministry of Nature Resource and Environment	Current staff	KII	1
Ministry of Agriculture and Rural Development	Current staff	KII	1

DATA COLLECTION RESPONDENTS			
Fulbright University Vietnam	Current staff	KII	1
HO CHI MINH			
enCity International Consulting Firm	Current Staff	Workshop (FGD)	1
Nguyen Tat Thanh University	Current Staff	Workshop (FGD)	1
National Economics University	Current Staff	Workshop (FGD)	2
CA MAU			
Ca Mau Districts' Office of Agricultural and Rural Development	Current staff	Workshop (FGD)	4
VIRTUAL			
Oxfam	Current staff	KII	1
WWF	Current staff	KII	1
Total			**30**

ANNEX III: DATA COLLECTION TOOLS

Mekong Delta Consultations Note-Taking Template

1. Please tell us about your role and responsibilities concerning climate resilience and agriculture in the Mekong.	
2. What do you see as the critical challenges resulting from climate change in the Mekong (or in this local area)? *This should only be discussed briefly and with reference to the priority areas.*	
3. What are you/your organization doing at present to address climate challenges in the Mekong (or in this local area)? What are your objectives? *Probe into different stakeholders including government, other donors, cooperatives and the private sector. Key policies should be explored. Also probe whether these efforts are joined up.*	
4. What other key initiatives are taking place at present?	
5. What impact is this work having, if any? What lessons could be learned?	
6. How are local people adapting and responding to climate change in the Mekong Delta (or in this local area)? *Probe specifically about impacts on/responses of women and young people, including migration. Also try to probe their engagement in programs, i.e. community co-management, and COVID-19 impacts.*	
7. What more could be done to address these issues? Who should be doing what and why? *This can be answered briefly but mainly interested in exploring who has influence and can get things done.*	
8. What is preventing or blocking more significant change to improve climate resilience? *Probe into policy, coordination, non-state actor*	

contribution, etc.	
9. In your opinion, what would be the most promising opportunities for USAID to support climate resilience in the Mekong [in the four areas of interest to USAID]? Why? *Probe specifically into why these are opportunities at this moment.*	
10. What should be avoided and why?	
11. What does an external partner like USAID need to understand about the region (or this area) in order to more effectively deliver this work?	
12. Wrap up points *(use this to explore anything not sufficiently covered above)*	
Key takeaways	

KII Informed Consent Statement

Study: Mekong Delta Climate Resilient Agriculture Project (PEA)

Hello, my name is _____ and I am here on behalf of USAID Learns. We are conducting a series of rapid consultations with stakeholders in Vietnam to inform the design of a new USAID's project on enhancing climate resilience in the Mekong Delta over the next five years.

Selection method and invitation to participate: Given your knowledge and experience on climate resilience in the Mekong Delta, you were selected to participate in an interview to understand your views on climate issues, your current work, and your ideas for USAID to tackle these challenges.

Procedures: We will ask some questions over 1 hour. If you don't have the information or prefer not to answer any question, we can move on. Your participation is voluntary and you may stop the discussion at any time.

Confidentiality: We will share your name, institutional affiliation and contact information with USAID Vietnam as one of the study participants, but we will not directly attribute any of the study content to you personally. In addition, after removing your name and any information that directly identifies you, our detailed notes will be available to USAID.

Risks and benefits: Given the COVID-19 pandemic, there is a risk of contracting or transmitting the disease during in person interactions like this interview. We do not anticipate any other risks to participating in this interview and there are no direct benefits for doing so.

Do you have any questions about this interview? If you are willing to be interviewed, please indicate this by verbally agreeing.

Questions: If you have any concerns, you may contact Sean Mulkerne (+84865323956) or the Social Impact Institutional Review Board at irb@socialimpact.com or +1 703 465 1884 with questions.

ANNEX IV: STATEMENT OF WORK

USAID/Vietnam Mekong Delta Climate Resilient Agriculture Project

Rapid Local Consultation Scope of Work

Proposed Dates: September 12, 2022 – November 30, 2022

Purpose

USAID Vietnam and the Ministry of Agriculture and Rural Development (MARD) have entered into a limited scope grant agreement to launch a new project promoting climate resilient agriculture in the Mekong Delta. The project, which is scheduled to commence in FY2023, intends to increase climate resilience, reduce methane emissions from the agriculture sector, increase sequestration of greenhouse gas emissions in the Mekong Delta, and conserve biodiversity. This will be achieved through the following objectives:

- Expanding low methane emission agriculture development
- Building climate resilience for vulnerable communities
- Promoting nature-based solutions
- Developing climate resilient and low emission development policies

USAID Learns is supporting the Vietnam Mission in designing the project, working with a multidisciplinary team within Vietnam and Washington. As part of this effort, Learns will undertake a rapid local consultation effort to better understand existing efforts, interests, and barriers to change in the region, and propose recommendations to refine and/or better target the project's interventions. This is intended to be a rapid effort to inform design and identify areas for further exploration at a later date.

Terms of Reference

This rapid consultation will support the Mission in understanding the context in which the Mekong Delta Climate Resilient Agriculture Project will operate. The consultation will focus on a few key questions that may be answered through engagements with national and local stakeholders. These questions include:

	Consultation Focus	**Indicative Detail**
1	Who are the key actors shaping climate resilience in the Mekong Delta? What are they doing at present? What motivates their actions?	This should target a range of actor groups in the region, including national and local government, local organizations, the private sector, cooperatives, donors, and others, perhaps through narrative mapping. It should also identify who are the key champions promoting climate resilience in the region and at the national level, and potential areas of support. This should also note the extent of collaboration and/or duplication of efforts between them.
2	How are local people adapting and responding to climate change in the Mekong Delta?	This should focus specifically on agriculture related issues, with an interest in exploring how climate resilience is understood. This may also include some discussion of how decision makers respond to these dynamics. This should also take account of gender and youth dynamics where possible, particularly focusing on migration away from rural areas.

	Consultation Focus	Indicative Detail
3	Where is there existing momentum to achieve the target objectives?	This should aim to identify entry points to change in the objective areas where possible, such as existing reform efforts or interventions, upcoming windows of opportunity, etc. This should focus explicitly on the four areas of intervention in the LSGA.

Methodology

To deliver the assignment, the team will conduct a desk review and hold discussions with key stakeholders. The team will also conduct one field trip to 1-2 provinces (still to be identified) based on the internal identification of high potential provinces (e.g., those with existing relationships with USAID Vietnam; those seen to be potential champions; or with existing entry points).

Rapid desk review

- GVN policies, directives, decrees, public statements, etc.
- Reports developed by donors, global funds, and local organizations related to climate resilience in the Mekong in the last three years.
- Programming of other donors and non-state actors.

USAID will be responsible for supporting the gathering of desk review materials.

Local consultations

- USAID Mission and Embassy staff concerned with climate resilience
- GVN representatives, including relevant ministries, provincial government representatives, and others.
- Local and international organizations (e.g. NGOs, local organizations, businesses and professional organizations, academic institutions)
- Private sector stakeholders

Deliverables

1. Summary findings: This is expected to be a high-level deliverable comprising an executive summary and a slide deck. This will review conclusions from the desk review and consultations, and make recommendations where possible.
2. Facilitated discussion reviewing the findings of the consultation: Learns will organize a discussion with USAID and other relevant stakeholders to review the findings and implications for the design process.
3. List of consulted stakeholders.

United States Agency for International Development
Hanoi, Vietnam