Disaster Risk Reduction in Viet Nam

Status Report 2020

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UNDRR
UN Office for Disaster Risk Reduction

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About this report

The disaster risk reduction (DRR) status report provides a snapshot of the state of DRR in Viet Nam under the four priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030. It also highlights progress and challenges associated with ensuring coherence among the key global frameworks at the national level; and makes recommendations for strengthening overall disaster risk management (DRM) governance by government institutions and stakeholders at national and local levels.

As this report is based on information available as of the end of the year 2019, an update on the COVID-19 impact, response and recovery using a risk-informed approach by countries is provided at the beginning of this report. This report has been prepared by the Asian Disaster Preparedness Center (ADPC) on behalf of the United Nations Office for Disaster Risk Reduction (UNDRR) through country consultations and a desk review of key documents, including legal instruments and DRR policies, plans, strategies and frameworks, etc.

The report has benefited from inputs by Viet Nam Disaster Management Authority, Ministry of Agriculture and Rural Developmen. The international organizations including UN Agencies, Asian Development Bank, The World Bank (WB) Group, the United States Agency for International Development (USAID), and a number of non-government organizations were consulted. UNDRR and ADPC acknowledges the government, international organizations and stakeholder representatives who contributed their valuable input and feedback on this report.

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This report serves as a reference document for the implementation and monitoring of the Sendai Framework. The findings, interpretations, and conclusions expressed in this document are those of the author(s) and do not necessarily represent those of the United Nations, including UNDRR, or its Member States. The presentation of the material in this report concerning the legal status of any country or territory or of its authorities or concerning the delimitations of its frontiers or boundaries, as well as the text and the tables, is intended solely for statistical or analytical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. While every effort has been made to ensure the accuracy of the information, the document remains open for any corrections in facts, figures and visuals.

UNDRR (2020). Disaster Risk Reduction in Viet Nam: Status Report 2020. Bangkok, Thailand, United Nations Office for Disaster Risk Reduction (UNDRR), Regional Office for Asia and the Pacific

Viet Nam's Response to COVID-19 and Disaster Risk Reduction

Since the first case was reported on January 23, 2020, Viet Nam has more than one thousand infected cases. The Government established a National Steering Committee and 45 Rapid Response Teams in early February 2020 leading to the declaration of national epidemic that got further enhanced as a nationwide pandemic on March 30,2020. While the nationwide lockdown was lifted on April 23 and social distancing rules have been eased, a local outbreak in Da Nang and Hoi An led to the reintroduction of social isolation measures on July 28 in these areas and few other local provinces later on.

Viet Nam's Gross Domestic Product (GDP) in the first three quarters of 2020 reflected the lowest growth reported in the past two decades, largely as a result of substantial slowdown in manufacturing, and a contraction in the service sector, in particular transport, tourism and hospitality industries. With the tourism industry accounting for approximately US$ 30 billion in annual revenue, Covid-19 has had an immediate negative impact on Viet Nam's economic development. As a result, the government has introduced a fiscal support package valued at VND 291.7 trillion (3.6 percent of total GDP) to support in economic recovery.

Viet Nam has taken a series of strict public health prevention measures to control COVID-19. The Government response to the outbreak has been timely and evidence-based based with a central and all-of-overnemtn approach providing critical in implementing policies and practices in COVID-19 response. The responsibilities and coordination among the ministries, government agencies, organizations and local governments in prevention and control were clearly assigned at the beginning of the pandemic.

Viet Nam had also put a long-term plan in place to enable it to cope with public health emergencies, building on its experience dealing with previous disease outbreaks, such as SARS, which it also handled remarkably well. The country demonstrated that preparedness to deal with infectious disease is a key ingredient for protecting people and securing public health emergencies. Key interventions by the Government include improving the capacity of the healthcare systems, widely applying preventative measures, enhancing risk communication, applying information technology and investing in science and research.

1. Introduction

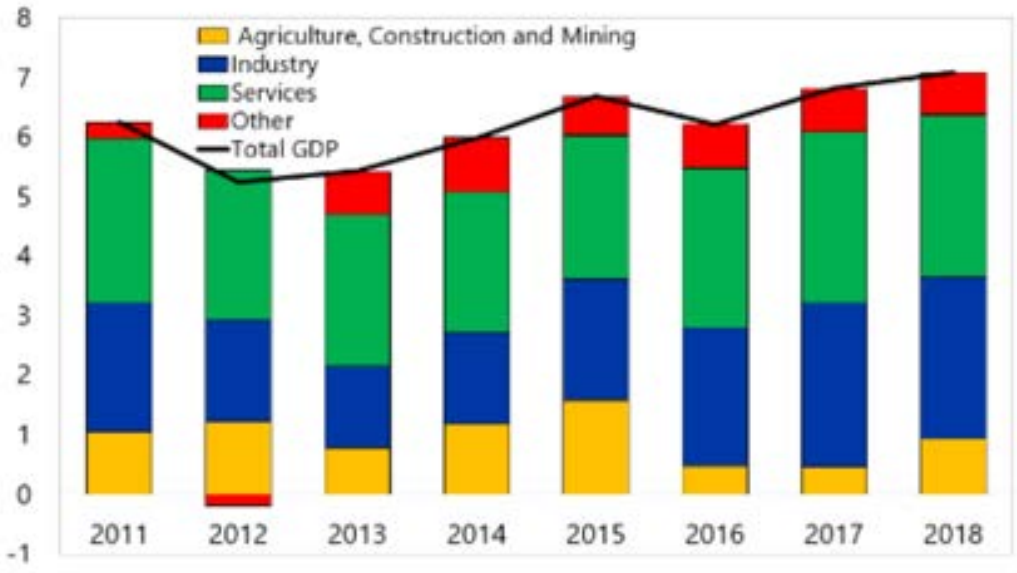
The Socialist Republic of Viet Nam is located on the east side of Indochina Peninsula, bordering China, Lao PDR and Cambodia southwest from the Gulf of Thailand as a part of Southeast Asia. It covers an area of 331,236 square kilometres, and the lands are characterised by two major river systems: The Red River in the north, and the Mekong River in the south. The topography of the country is also is immensely diverse. Mountains and hilly terrain cover about three-fourths of the total area, comprising a mountain system which extends approximately 1,400 kilometers from the northwest border towards the southeast. Furthermore, as the country is located on a tropical climate zone, the weather is characterized by abundant rainfall. Viet Nam receives most of its annual precipitation during the rainy season occurring between June and August, influenced by the monsoons of the South China Sea.

Administratively, Viet Nam is divided into six regions: Red River Delta, Northern midlands and mountain areas, North Central and Central coastal areas, Central Highlands, South East, and the Mekong River Delta (General Statistics Office of Viet Nam, 2018). State level governance is ruled by the country's single political party – the Communist Party of Viet Nam (CPV) – which forms the foundation of the nationwide political system. The National Assembly, the highest-level representative body of the people, exercises three main functions: legislative function, policy making function and supreme supervision over all activities of the State. The President is the head of state to represent the country in domestic and foreign affairs, and the Prime Minister is the head of government, both elected by the National Assembly (Government Portal, 2019).

In terms of sub-national administration, Viet Nam comprises three-administrative levels: provincial, district and the communes. Under the 63 provinces, People's Councils and People's Committees are established as the governing bodies for each respective administrative level comprising 71 cities (under provinces), district level bodies: 49 urban districts, 48 towns, 545 rural districts, as well as commune levels bodies. The latter comprises 1,596 wards, 607 town districts, and 8,959 communes (General Statistics Office of Viet Nam, 2018). The classification of the administrative units takes into account various criteria including population size, natural area, number of attached administrative units, level of socio-economic development and specific features such as rural, urban or island areas (VietnamLaw, 2017). Furthermore, numerous socio-political organizations represent the interest of different segments of the population and livelihood groups, and form the core mechanism for providing representation for people in policymaking. These include groups such as the Vietnamese Trade Union, Vietnamese Women's Union, and Vietnam Farmer's Union.

The country has also achieved remarkable economic growth and poverty reduction under the Doi Moi reform process, which aimed to boost macroeconomic development by encouraging export-orientated strategy, supported by widespread industrialization. As a result, Vietnam has lifted 45 million people out of poverty, and the poverty rate declined from 70 percent to below 6 percent by 2019 (World Bank, 2019). The country has also enjoyed steady GDP growth due to flourishing industry and service sectors in the past recent years.

Figure 1. GDP growth by sector in Viet Nam (IMF, 2018)



Rich with natural resources, including coal, petroleum, timber, hydropower and fish, Viet Nam is a major exporter of the region, with coal being as one of the most significant products. The industry provides employment to about 31 percent of the workforce in mining and quarrying sector (World Atlas, 2018). Viet Nam has increased fishing capacity in recent years, transforming the fishing sector from informal and artisanal activities, to fish products for export to global markets, generating export value of US$ 15 billion annually (UNCTAD, 2018). Viet Nam' s economic growth still looks promising, despite trade tension and volatility of emerging economies. However, financial sector has to be strengthened with modernized economic institutions to improve fiscal and monetary management to maintain economic competitiveness.

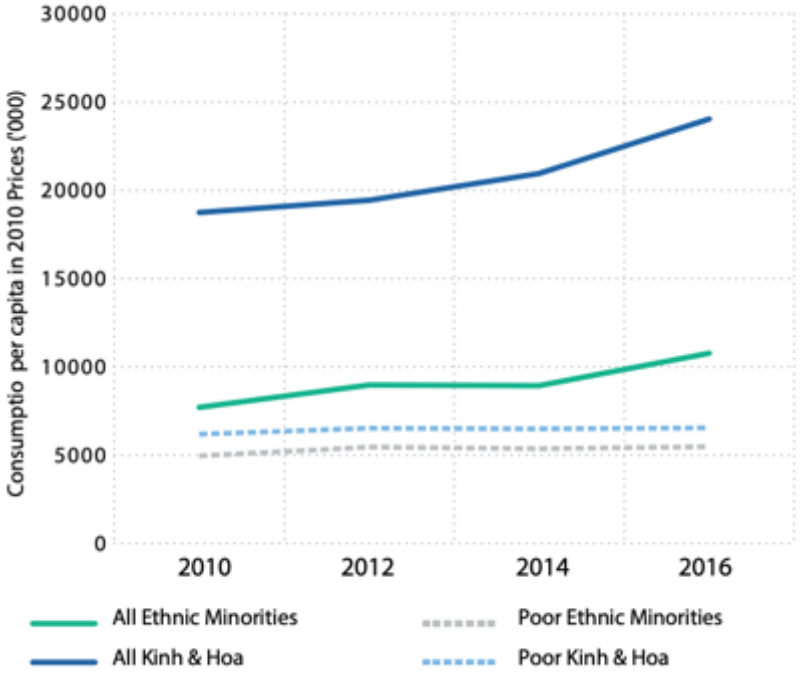
Viet Nam's overall development is threatened by various hazards including floods, drought, typhoon, storms, and landslides. Slow, compounding impacts of coastal erosion, sea level rise and saline intrusion as a result of climate change also aggravate disaster risks. The coastlines experiences five to six typhoons each year during the southwest monsoon from June to November, while northern parts of the country is susceptible to landslides and flash floods during heavy rain and storms. The Mekong Delta, the most populous area in the country, has also witnessed significant fluctuations in regional weather (DMPTC, 2019), which endangers not only the economic competitiveness, but also the security and safety of much of the population. Viet Nam is considered one of the countries hardest hit by adverse impacts of changing climate, ranking sixth of the countries globally most affected by extreme climate events from the past two decades (Germanwatch, 2019).

1.1 Demographic Characteristics

As of 2018, the total population was estimated to have reached 94.7 million, with the urban population showing a growing trend accounting for 33.8 million persons (35.7 percent) (General Statistics Office of Viet Nam, 2018). Still, given the bountiful marine and riverine resources, deltas and coastal areas remain densely populated, providing livelihood opportunities in large-scale fishing and aquaculture. The Red River Delta, for example, has the average population density of 1,014 persons per square kilometre. However, densities are highest in the urban areas attracting people seeking employment, services and opportunities. Ho Chi Minh City and Hanoi have the highest population densities at 4,171 and 2,239, respectively (General Statistics Office of Viet Nam, 2018). Furthermore, over the last three decades, Viet Nam's population has experienced an increase from about 60 million in 1986 to 97 million in 2018 (World Bank, 2019), making Viet Nam the third most populous country in ASEAN (ASEAN, 2015). The growth mirrors significant improvements made in the health sector, which has increased life expectancy from 68 years in 1999 to 73.2 in 2014 (ASEAN, 2015). Successes in poverty reduction also contribute to the developments, and in 2019, Viet Nam ranked second among ASEAN nations with least share of people living below poverty line (ADB, 2019).

Similarly, availability of public utilities and critical facilities has improved in the past decades, offering better living conditions to the people. The Comprehensive Poverty Reduction and Growth Strategy (CPRGS, 2002-2005) was one of the of key development instruments focusing on improving rural development and access to basic services as well as to improve access to water supply and electricity. Rural access to clean water reached 70 percent in 2016, as opposed to 17 percent in 1999 (World Bank, 2019). Widespread well-being and availability of services has resulted in the growth of the country's Human Development Index, which is now among the is highest among middle-income countries. In 2018, the HDI had reached 0.693, and Viet Nam was placed as 118th among 189 measured countries and territories (UNDP, 2019). However, rate of development is not universal across the country, especially among ethnic minorities (World Bank, 2019). For example, the ethnic subgroups are lacking behind on many development indicators, including on annual consumption per capita measured between 2010-2016 (Figure 2), and while the economy grows, gaps between minorities and the main population groups have been increasing (World Bank, 2018).

Figure 2. Trends in Annual Consumption per Capita, 2010-16 (World Bank, 2018).



In terms of labour, more than half of the total population (55.4 million) are 15 years and above, and out of this age group, 54.2 million are engaged in economic activities. However, future projections indicate that Viet Nam will turn into an aging society with persons aged 60 and over making up of more than 54 percent of total population. Thus, a longer-term plan on pension reforms is required (IMF, 2018) to ensure financial security of retired populations. Furthermore, the coverage of healthcare schemes and social welfare services for aging populations must be reinforced as well. An aging society will also have implications on socio-economic vulnerability in terms of disaster and climate risks, especially among the low-income groups highly exposed to hazards.

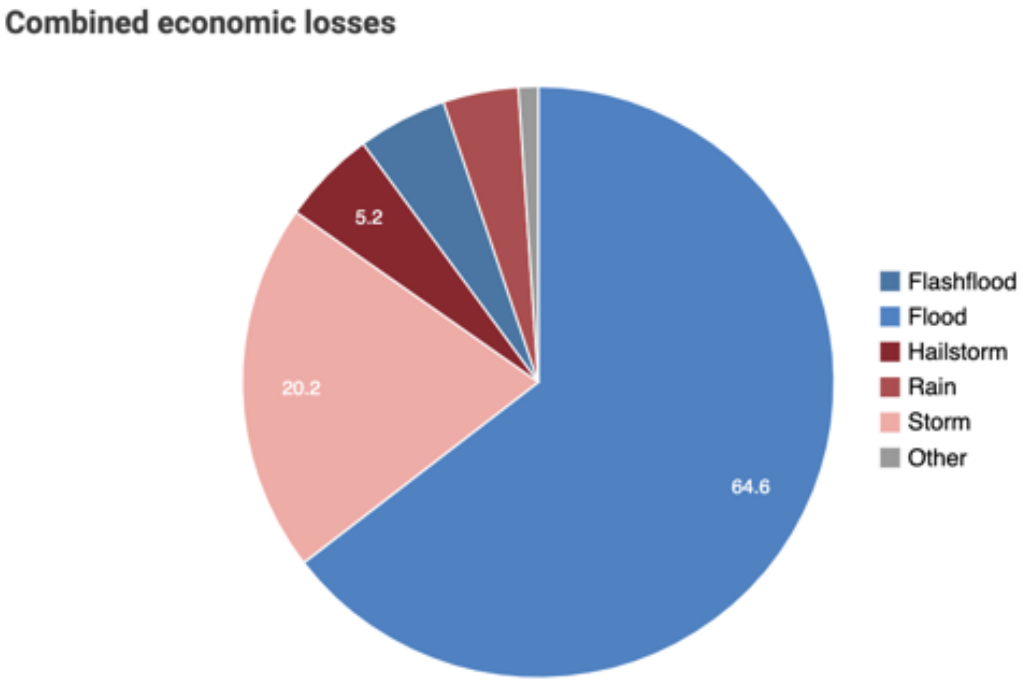
1.2 Economic Impact of Disasters

Disasters may indeed hinder economic development and affect a country's ability to sustain positive trends due to the wide range of impacts which hazards may have on human and natural systems. While Viet Nam is ranked highly in the ASEAN region due to its relatively stable economy and upwards growth trajectory, the country has suffered profound impacts of disasters which have affected macroeconomic conditions, public finance and longer-term fiscal health. According to the Central Steering Committee for Natural Disaster Prevention and Control, the country has suffered an average annual loss of 1-1.5 percent of the GDP over the past three decades. In 2016 alone, Viet Nam had to absorb a loss of US$ 1.8 billion in the aftermath of the typhoon Son-Tinh, alongside flooding and lesser storms occurring throughout the country between June and December (VietNam News, 2017). Overall, floods and storms have caused largest economic damages from the total measured impacts (JICA, 2018), seen in Figure 3.

Disasters occurring in the country may also cause long-term burdens on the government's public financing, which eventually has an impact on the overall expenditure and ability to manage fiscal balances. Despite the existing budgetary provisions which set aside 2-5 percent of the available resources for disaster contingencies at the national and provincial levels, the costs of reconstruction and recovery habitually exceed the financial capacities. Reoccurring hazards and major disasters contribute to persisting funding gaps for recovery and reconstruction in Viet Nam (UNDP, 2015). Furthermore, without proper insurance mechanisms for agricultural sector and farming-based livelihoods, the government has to bear financial burden of immediate response services and recovery, mostly mobilized from ad-hoc financial allocations (UNDP, 2016), which is increasing fragility of the fiscal system of the country.

Furthermore, variations in the hydrometeorological cycle are also a concern given the rapidly changing climate and its impacts on rainfall, droughts and extreme temperatures. During the most severe drought in 90 years occurring in 2016, about 275,263 hectares of rice paddies and 189,878 hectares of perennial crops were severely affected (UN Viet Nam, 2016). While such events have severe macroeconomic consequences, impacts at household level cannot be overlooked either, especially those highly dependent on subsistence farming and agrarian-based livelihoods who may suffer significantly. In the aftermath of the 2016 drought, it was estimated that approximately two million people in 18 provinces were affected to varying degrees of impacts and losses on their livelihoods during the drought between January and May 2016. One of the hardest hit regions was the Central Highlands, which is also among the poorest areas in the country (EU/ECHO, 2016). Overall, it can be expected that those with the least bare the largest share of the climate change impacts in the country due to their low incomes, lack of risk transfers and high exposure to the elements.

Figure 3. Combined economic losses due to disasters in Viet Nam between 1990-2014 (PreventionWeb, 2014).



1.3 Social Impact of Disasters

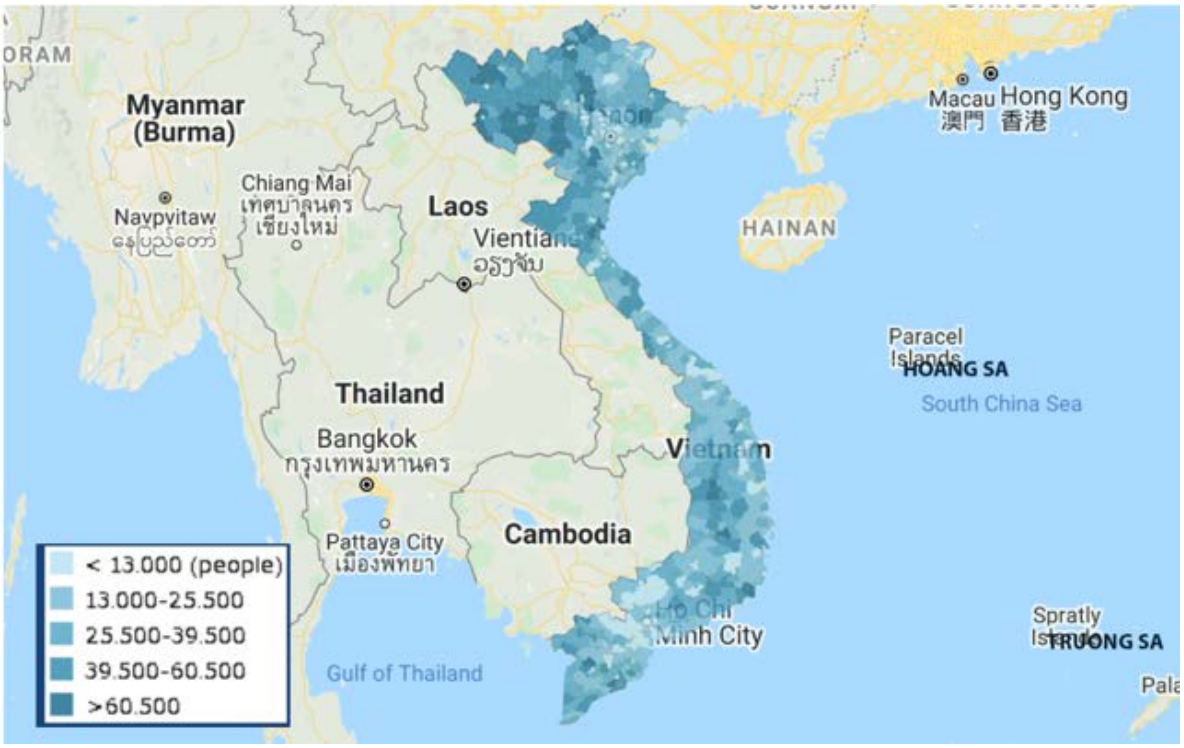
Different segments of population suffer different and disproportionate social impacts of disasters. In Viet Nam, disaster impacts could vary given that society is made up of heterogeneous population groups from different backgrounds, with differing access to social capital, support and services. Disparities between rural and urban areas remain obvious, determining the access to public facilities, services and provision, availability of which will cushion shock from extreme disaster and climate events, as well as support individuals and households in managing chronic stress from prolonged and accumulated impacts. The country is also characterized by geographically stratified poverty; with rates tending to be highest in the northernmost, mountainous regions and rural districts (Figure 4). These areas tend to be more vulnerable due to lack of adaptive capacity, preparedness and lack of access to risk transfers and services among people who are struggling below the national poverty line.

However, poverty is not the only determinant of the severity of disaster impacts in the country. For example, typhoons and storms are life threatening events for coastal communities, in particular fishing communities in Viet Nam, such as in Typhoon Linda 1997, causing considerable casualties among fishermen (JICA, 2018). Male fisher folks, who are often the breadwinners in coastal households, are among the most at-risk population to storms, and during monsoon. Women and other vulnerable groups, including poor families, children, disabled and elderly people suffered disproportionate impacts of hazard as well. The 2016 drought revealed that these group faced challenges in reaching out to drought relief services, accessing clean water, proper sanitation and healthcare services. For example, women (who constitute to up 60 percent of poor farmers) had to bare additional burdens to meet household needs while experiencing additional financial constraints resulting in added work commitments that further attributed to their time poverty during the drought hit periods (UN Viet Nam, 2016).

A study on the interrelatedness of household welfare and disasters, conducted at the community levels in Viet Nam, also revealed how social factors relate to disaster impacts depending on the demographics and population groups. For example, it became apparent that the impacts of storms experienced by the Kinh households, the majority of population, were relatively lower when compared to households of ethnic minorities (Arouri, et al., 2015). Education also determines level of resilience to disaster, as households with high education are found to have more resilience against floods and droughts than those with low education due to higher capability to prepare (financially, and otherwise) and anticipate impacts (Arouri, et al., 2015).

Rapid urbanization and process of industrialization have also increased pressures on urban systems in certain areas of the country, and along the coastline (IOM, 2016). Migration to cities in the search of employment opportunities contributes to organic expansion of urban areas, while the regional governments' capacities are often not adequate to meet increasing demand of housing, utilities and city services for ever-increasing city populations. Uncontrolled settlements generating slums and squatters on the riverbanks and waterways reflect the deteriorating conditions of the urban poor, who are among the most vulnerable groups to flood risk, water pollution and environmental degradation occurring in major cities. Effects of recurrent flood may also result in loss of contingency in the healthcare sector, especially during severe events. Lack of clean drinking water often contributes to spread of vector-borne diseases such as diarrhoea, eye infections, cholera, dysentery and typhoid.

Figure 4. Poverty Rate by District in 2014 (UNDP, 2020).



2. Disaster Risk Profile

2.1 Hazards and Climate Change

Numerous hazards affect Viet Nam with varying scales of frequency and impact depending on topography, altitude, and climatological factors. For example, while the two main river systems, provide water and fertile land for agriculture, aquaculture, households and other productive sectors, they also render the populations in their vicinity exposed to flooding. Viet Nam's water resources expand throughout the country, comprising 2,360 major rivers and streams, smaller deltas and river basins along the Northern Central and Central Coastal Areas, which also translates to high flooding exposure. While the deltaic flooding has been considered as a part of the natural water cycle in the past, increased tides, heavy precipitation, erosion and sea level rise affected by the changing climate are aggravating flood risks (Phach, 2012).

Viet Nam also experiences an average of four to six typhoons each year, during typhoon season between April to September in the southwest, August to November in the central coastline, and October to March in the north-eastern region. Also, numerous storms make landfall in Viet Nam annually (ASEAN-ROK Cooperation Fund, 2017). Typhoons and storms are accompanied by strong wind, tidal waves, storm surges and incessant rainfall, with the potential to cause catastrophic damages in the country. They also have high spatial variability, with central and coastal provinces at higher risk (Figure 5).

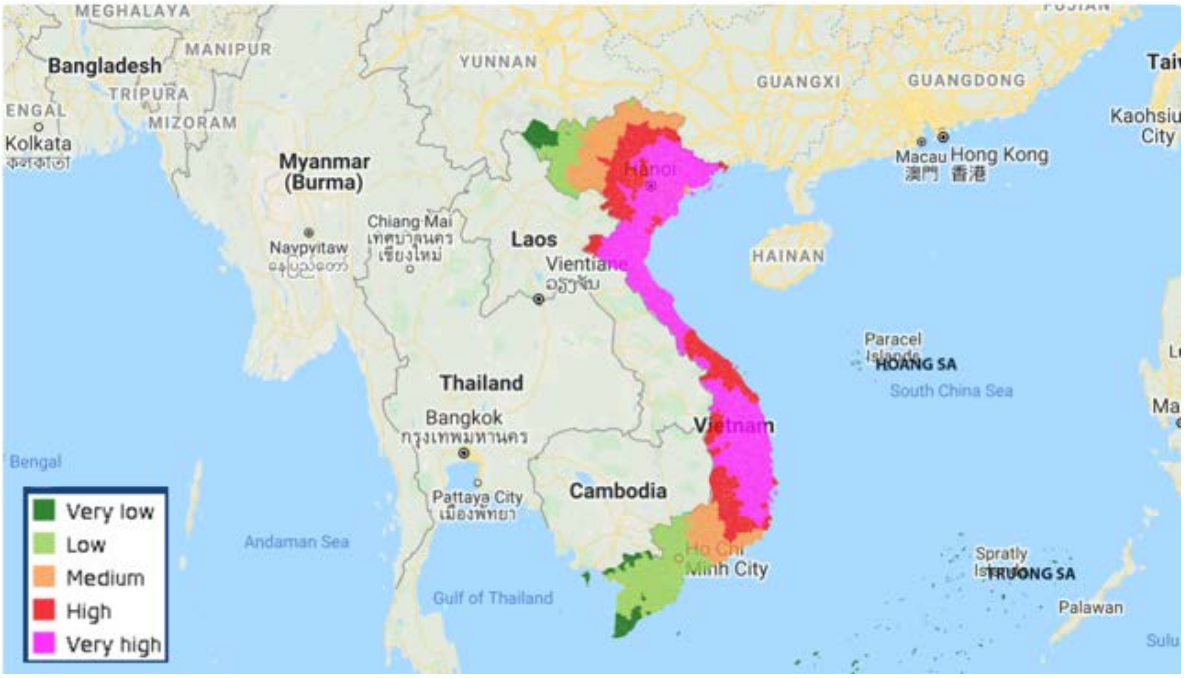
Floods are the most frequent and deadliest hazard in Viet Nam, and have caused 68.8 percent of all casualties between 1990-2014 (PreventionWeb, 2014). Almost all the provinces and cities in Viet Nam are affected by floods of varying intensity and duration. Most parts of the country receive an annual average of 2,000 mm of rainfall, apart from the highlands in the northern and southern regions which have an average of 3,000 to 4,000 mm, respectively (JICA, 2015). Given the higher rate of precipitation and varying soil conditions, flash flooding and water-induced landslides are a concern in mountainous provinces.

Drought is also a recurrent hazard affecting all parts of the country. In the Central regions, droughts are usually caused by lack of rainfall and limited water retention capacity of reservoirs, aggravated by hot and sunny weather. In 2005, many of the southern provinces faced shortage of rainfall and prolonged heatwaves, resulting in a disaster causing a rapid decline of water levels in major river systems and reservoirs, which eventually affected approximately one million people (UNW-DPC, 2014). Similar to storm risks, droughts tend to affect specific parts of the country depending on the topography and regional weather (Figure 6).

Also, epidemics create a challenge to the public health system, alongside the economy. In terms of vector-borne diseases, malaria and dengue are both prevalent in the country, and continue to stress the healthcare system due to their annual occurrence, especially during the monsoon season. Similarly, typhoid fever and tuberculosis (TB) are relatively common diseases in the country while, zoonotic diseases can endanger the development trajectory. Past outbreaks such as the 2019 African Swine Flu have had severe impacts on domestic consumption and exports as well.

Climate change is also a severe concern in Viet Nam given that it is likely to exacerbate the impacts and frequency of hydro-meteorological hazards, rendering them more unpredictable and destructive. Intense rainfall changes, changes in storm patterns, and prolonged periods of drought extending over several months are among the challenges that could be witnessed over the upcoming decades. There has already been an increase of annual average temperature by 0.5 – 0.7 °C over the past 50 years, and the sea level has risen by 20 cm on average (Government Portal, 2019). By 2100, the sea level could rise by 75 cm to 1 m compared to the 1980-1999 period, thus rendering many of the coastal cities and agricultural production areas inhospitable in years to come without adaptation and mitigation actions. Based on the projected sea level rise, about 40 percent of the Mekong Delta area, 11 percent of the Red River Delta and 3 percent of coastal provinces may be inundated. Approximately 10-12 percent of Viet Nam's population could experience direct impacts of this change, which will lead to significant economic losses as well (Government Portal, 2019). Since about 60 percent of the capital city is located 1.5m above mean sea level (ADB, 2010), urban flooding could become a pressing concern during the upcoming decades. Conversely, and due to the unpredictability of change, the projected rise in regional temperature and its impacts on agricultural output and wellbeing (heat stress), could increase the severity of droughts as well.

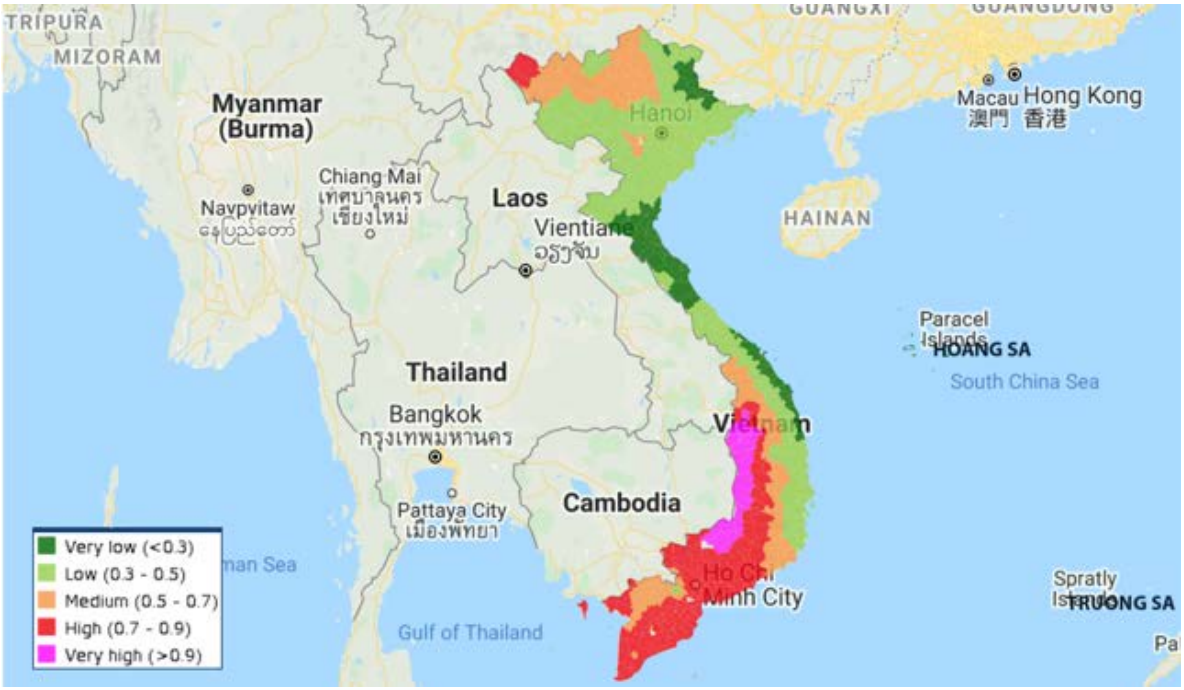
Figure 5. Storm frequency in Viet Nam measured between 1960 and 2017 (UNDP, 2020).



The impacts are particularly threatening to areas that have high importance to national food security, are subjected to poverty, or are characterised by populations highly dependent on livelihoods that rely on the stability of the ecological systems. For example, people in the Mekong Delta have depended on seasonal flood for cultivation and local livelihoods since time immemorial. The area is known as a major rice-growing region, contributing to more than half of rice production of Viet Nam. Thus, sea level rise, when coupled with major anthropogenic stressors from pollution to soil erosion and mismanaged land use, causes significant changes in the ecosystem, exposes agricultural lands, and endangers coastal livelihoods. Furthermore, given that the Mekong Delta is located 0.8 m below the sea level on

average, any potential increase could drastically heighten the risks of inundation and saline intrusion (UNDP, 2011).

Figure 6. Annual drought susceptibility in Viet Nam per province, measured between 1985 and 2015 (UNDP, 2020)



2.2. Exposure

As evidenced, hazard impacts are not distributed evenly across Viet Nam. For example, the geographical distribution of hydro-meteorological hazards (World Risk Report, 2019) renders the northern and central mountainous areas highly exposed to flash flooding and landslides. Yet, about 70 percent of the country's population are inhabiting low-lying deltaic zones which are highly exposed to flooding impacts and storm surges, hence rendering much of the country exposed to the hydrometeorological hazards (Bangalore, et al., 2019). Rapid urbanization in Viet Nam has contributed to the peoples' exposure to urban flooding, especially in cities including Ho Chi Minh City, Hanoi, Hue, Nam Dihn, Hai Phong and Can Tho. Viet Nam currently ranks 40th most at-risk to natural hazards on the World Risk Report with a very high rating on the report's exposure scale (Bundris Entwichlung Hilft, 2019).

Furthermore, given that Viet Nam has expanded most of its economic activities in areas highly susceptible to the impacts of frequent hazards, many of the productive facilities and critical infrastructure are increasingly exposed to the elements, leading towards heightened disaster risks. For example, in Ho Chi Minh city alone, 15.7 percent of the manufacturing firms and industrial areas (including SMEs) are likely to be affected by inundation based on future level rise projections (Leitold & Revilla, 2018). Similarly, road and transportation infrastructure across the country are also highly exposed to hazards and climate change, loss of which could contribute to significant economic losses and heightened reconstruction costs in the aftermaths of catastrophic events. Impaired transportation networks could also translate to difficulties in managing relief efforts, particularly in areas that are hard to reach. Overall, estimated provincial road assessment vis-à-vis sea level rise by 2050 indicates

high vulnerability and exposure of the road networks in the coastal regions, affirming the need for rapid adaptation interventions (Chinowsky, et al., 2015).

2.3 Socio-economic Vulnerability

Exposure also correlates with socio-economic vulnerability, as people rarely tend to inhabit dangerous areas – rather, they are forced to expand on unsafe land to generate income, or are forced to inhabit urban slums due to unaffordable housing (and space) in cities that are still major providers of employment opportunities. As evidenced, agriculture and small scaled farming remain significant employment sector that engage approximately 43 percent of the total population. Thus, many are also vulnerable due to their dependency on livelihoods that suffer significantly from the impacts of hydrometeorological hazards. Yet, escaping this cycle is also difficult for many. For example, the agriculture sector accounted for VND 39.8 milion measured in terms of labour productivity in 2018, whereas the more productive sectors (from mining and quarrying to electricity) had a productivity value up to 57 times higher per person than of those employed in agriculture (General Statistics Office Of Viet Nam, 2018). This highlights the disparities in earning among labour in key productive sectors of the country and illustrates how deeply stratified different income groups are. Eventually, this has led to the economic marginalization of parts of the population, which also heightens disaster risks due to lack of access to risk transfers (such as insurance and savings).

Poverty in certain population groups and within specific geographical boundaries is still widely prevalent. For example, ethnic minorities, comprising 15 percent of the total population, are more likely to be living in poverty; in 2016, this groups constituted to 73 percent of those living below the poverty line nationwide (World Bank, 2018). In terms of schooling, the poor and ethnic minorities also face challenges in attaining lower tertiary education, indicating that they may have lessened access to economic opportunities, which further strengthens the cycles of poverty and vulnerability (World Bank, 2018). Also, certain regions still lag behind in economic and social development, including the provinces of Dien Bien, Hoa Binh, Lai Chau, Lao Cai, Son La, and Yen Bai, with poverty rate resting at 45 percent, as opposed to nationwide 18 percent in 2016 (ADB, 2018). The region is also highly exposed to flash flood and landslides, and given the higher prevalence of poverty, vulnerabilities are magnified in conditions characterised by lower living standards.

The nexus between gender, vulnerability and disasters is also an important aspect of the social vulnerabilities in Viet Nam. While women have important roles and strengths in supporting their families, and are often engaged in income-generating activities from farming to conservation, they are also experiencing heightened vulnerabilities due to societally determined roles and barriers contributing to their disposition in the country. For example, women are more likely to be engaged in unpaid work, including caring responsibilities (from children to the elderly), household management and other responsibilities that contribute to higher time poverty. If engaged with paid labor, women are more likely to be receiving lowly pay, or are working in agriculture which is highly dependent and vulnerable to the fluctuations in the hydrometeorological cycle (Hudson, 2018). Thus, due to social, economic and political barriers, women are considered to have less capacity to cope with, adapt to, and recover from disaster and climate impacts in Viet Nam (Hudson, 2018).

2.4 Physical vulnerability

As much as the socio-economic factors in the country correlate with exposure, they also create physical vulnerabilities at the household levels. When combined to the interplay of hydro-meteorological hazards and climate change, such conditions drastically contribute to increased disaster risk. In fact, housing is considered as one of the most vulnerable sectors to hazards in Viet Nam due to the high number of poorer communities, inadequate housing solutions characterizing them, and high exposure to typhoons (Tran, et al., 2012). While higher income households can afford expensive plots and well-built houses or apartments in central urban areas, those poorer are likely to inhabit non-engineered houses which do not incorporate necessary provisions to improve their resiliency, such as joint connections or fire-resistant design (Tran, et al., 2012). Furthermore, the lower-quality houses are more likely to be located in suburban or peripheral zones which are highly hazard-prone, which further heightens their vulnerability.

In the urban settings, poor drainage is also considered a major factor contributing to increased flood risks, because organic expansion of cities often imposes stress on the already limited capacity to manage continuous heavy rainfalls, tidal increase, upstream water discharge and water locking. Drainage and sewerage facilities in major cities, such as Ho Chi Minh, Hanoi and Can Tho, are largely developed locally, and remain disconnected from a synchronized system, which hampers the efforts to direct the flow of flood waters. Furthermore, poorly maintained sewers, canals and improper wastewater treatment are contributing to flood vulnerabilities in many cities, and further contribute to water pollution, prevalence of diseases and loss of access to safe water (World Bank, 2019). Urban infrastructure still requires further development in cities across the country to meet the needs of the increasing number of residents, and to maintain competitiveness of socio-economic development.

Vulnerability of the wider infrastructure must also be addressed in this context, as it highly relates to the relative safety of any given city or area. For example, dikes and irrigation channels are common structural measures used for water management in areas characterized by complexed river networks, and also help coping with floods. Yet, the existing systems requires retrofitting, maintenance work and integrated adaptation measures to be able to accommodate contemporary challenges. In Viet Nam, irrigation systems often have limited capacities to meet the water demand, especially periods of drought, which then hinders agriculture productivity (ADB, 2018). Despite having one of the best irrigation coverage in Southeast Asia, extending throughout nearly 50 percent of the country's arable land area, more than half of the irrigation systems remain under capacity due to outdated infrastructure, which then heightens the vulnerability of the agricultural sector (and its workers) to droughts (ADB, 2018).

In terms of coastal protection, sea dikes are a common method used in Viet Nam to shelter the coastal regions from the impacts of typhoons, storm surges and coastal flooding. However, many of the current structures are not able to withstand influx of sea water during heavy storm surges, leaving the coastal areas and agricultural land exposed to soil intrusion. Moreover, the ongoing construction of hydropower dams in many regions has been evidenced to interrupt the flow of sediments towards the coast, which causes contributes to receding of land and erosion in coastal areas (Pilarczyk, 2005). Thus, exploring the interconnectedness of the environment, physical vulnerability and development must be reinforced to adequately identify and assess risks posed by anthropogenic changes. The

issues could also be addressed by investing in ecosystem-based mitigation measures, including mangrove forests which provide natural flooding barriers. However, they currently remain underutilized.

2.5 Future of Disaster and Climate Risks

Due to the high prevalence of hydrometeorological hazards, and the large number of directly affected vulnerable sectors reliant on water resources and seasonal precipitation, Viet Nam is highly at risk in terms of climate change impacts. Farmers and agrarian communities in the deltas and other flood prone areas across the country are likely to absorb first waves of the impending impacts, highlighting the needs to focus on crop diversification and other adaptation actions now to overcome negative consequences of the changing weather patterns. However, to meet the costs associated with building resilience, households must be able to access support from welfare schemes, insurances, loans and credit, alongside improved irrigation facilities and flood defences. The latter is especially important, given that relying only on personal risk management is likely to fall short due to high costs of needed adaptation measures vis-á-vis the current costs of farmers supporting the lives of themselves and their families. Yet, protecting development from climate change is reliant on such interventions, and building resilience (alongside greening the economy) is of paramount importance to maintain Viet Nam's pathway in becoming a modern, industrialized economy by 2035 (IFAD, 2010).

Also, shortfalls in the management of the water resources render the country highly susceptible to the impacts of droughts and flooding which are directly linked to climate change. With emerging industry as the key sector generating GDP, increasing demands on water becomes apparent. Furthermore, the Lower Mekong River and its Tributaries currently provide water not only to meet the demands of agriculture and industrial sector, but it is also the main source of water supply for nearly 18 million people (DMPTC, 2019). Thus, any reduction in the availability of water, especially during dry seasons, may have detrimental impacts to the economy and wider wellbeing. Also, future projections indicate that in next 25 years, increased urban population will require twice the daily water supply of the current existing capacity (World Bank, 2019). Other major, related challenges include the widespread hydropower activities which impose stress on river systems, especially the downstream areas, and instigate numerous changes in river ecologies and water flows. Unless managed, these side-effects of the development of the energy sector may have deleterious implications to communities and households dependent on the water resources affected by them. Also, as the industrial economic activities grow, water pollution and environmental degradation are becoming increasingly prevalent (ASEAN-ROK Cooperation Fund, 2017).

Furthermore, rapidly increasing uncontrolled development and urbanization may have compound impacts on disaster risk and climate risks, even though some mitigation measures are in place. Despite the investments made in flood mitigation using flood defence infrastructures, dikes and embankments, haphazard expansion of built environments lacking risk-informed spatial planning could negate such efforts (World Bank & GFDRR, 2018). This is a significant concern, especially in light of the fact that sea level rise of only 50 cm could inundate up to 20 percent most of the coastal provinces (Figure 7). Also, statistics indicate that in Viet Nam, 41 percent of urban population are living in slums, due to which poor access to sanitation and clean water persist even in the urban setting (OECD, 2014), and contribute to higher rates of exposure, vulnerability to the environment and diseases, as well as to higher levels of psychosocial malaise and antisocial behaviour in urban regions.

Figure 7. Percent of area inundated due to 50 cm sea level rise (UNDP, 2020).

3. Disaster Risk and Climate Action Interventions

As evidenced in the previous chapters, it becomes clear that disaster and climate risk management in Viet Nam is a complex task, despite interventions, investments and progress made in terms of achieving development targets. Still, Viet Nam is on track in achieving its priorities in achieving the Sustainable Development Goals, and is seeking to achieve green, equitable and inclusive growth for the benefit of its citizens. This section provides an overview of the country's process vis-à-vis the mandates of international agreements and frameworks, highlights some of the key issues and provides suggestions for supporting the further implementation of disaster risk reduction (DRR) and climate change adaptation (CCA).

Priority 1. Understanding Disaster Risk Analyzing, collecting and managing disaster and climate risk-related data is necessary for achieving a comprehensive understanding of disasters. Data is required to support the processes of conducting risk and vulnerability assessments, as well as for prioritizing investments for resilient development. Data should also be categorized as well as appropriately disaggregated to facilitate disaster trend projections and the identification of impacts to different demographics, and all the information should be accessible to the public and authorities at all levels, stored within well-managed disaster information management systems. In Viet Nam, investments have targeted to increase the availability of hazard data, intended to increase the coverage of risk modelling in the country. Interventions have been implemented with the support of international partners and technical agencies such as RIMES, UNESCAP, WMO, World Bank, UNDRR and JICA. Ongoing work to increase the collection of disaster damage and loss data for reporting against the Sendai Framework and Sustainable Development Goals (SDGs) should continue, in particular the use of this data to inform national DRR policies and activities. One of the most recent initiatives under the priroty one is the development of Viet Nam's Climate Risk Index, which is an online platform developed jointly by the UNDP, MARD and MONRE. It collates updated climate and hazard risk information from various sources (in all 63 provinces) into one database, visualized into maps and graphs to support public use (UNDP, 2020). Datasets include information that covers socio-economic development, climate change profiles (including future projections), major hazards disaggregated by region, a comprehensive vulnerability index of key sectors, as well as a risk index of the whole country (UNDP, 2020). At local level, risk assessment methodology has been developed, in consideration of local climate change impacts. It is currently feasible to implement with local capacities and resources and can be utilized in community-based disaster risk management interventions. The results of the process are presented in community-based disaster and climate change risk assessment reports (CBDRA reports) providing a comprehensive village risk profile for locally led DRM actions.

Furthermore, to support developing a more detailed understanding of risks in the country, advanced technical solutions for hydro-meteorological modelling and risk assessments are employed in many cities and river basins. However, some of these products still remain as standalone interventions or are in pilot testing for potential future application. Among them, the MIKE FLOOD software developed by DHI is a modelling tool for analyzing flood events in the entire Huong River Basin, and it has potential for future applications that have been explored by conducting User Group Meetings with government agencies and other stakeholders (DHI, 2015). Similarly, the CityStrength Diagnostic, a tool developed by the World

Bank, is currently employed to assess the vulnerabilities of interdependent city systems to flooding and climate risks in the city of Can Tho. It has helped in promoting risk-informed urban planning, and in prioritizing climate-resilient investments in the low-lying coastal city (GFDRR, 2019).

Priority 2. Strengthening Disaster Risk Governance to Manage Disaster Risk Effective disaster management and CCA also require robust legislative frameworks and operating procedures which support activities under all of the phases in the disaster management cycle from preparedness to mitigation, response and recovery. They should also integrate considerations for longer-term financing, program sustainability.

In terms of the implementation of disaster and climate risk-related activities in Viet Nam, the Central Committee for Natural Disaster Prevention and Control (CCNDPC) serves as the apex policy formulation and decision-making body at the national level. It is steered by the Viet Nam Disaster Management Authority, which acts as the Standing Office of the CCNDPC, operating from within the Ministry of Agriculture and Rural Development (MARD). The next tier of the country's DRM governance comprises the Central Committee for Flood and Storm Control (CCFSC) under MARD, responsible over the coordination of DRM and risk reduction activities across various agencies. Similarly, the Disaster Management Centre (DMC) operates with the mandate on implementing of country's localized CBDRM strategy (CFE-DM, 2018).

In terms of legislation and policy, DRM Decrees and regulations issued in the past decade demonstrate a wide instrumental reach. Attempts to harmonize various fragmented regulations, overlapping mandates and unclear responsibilities into a single legislative provision were achieved in the new Law on Natural Disaster Prevention and Control 2013, effective May 2014. The LNDPC laid down necessary institutional arrangements, functionaries and mandatories covering essential functions of DRM and disaster response in Viet Nam (IFRC, 2014). Furthermore, it placed strong emphasis on long-term prevention, risk reduction and risk-informed socio-economic development, and sought to restructure the CCFSC into a new structure of Central Steering Committee for Natural Disaster Prevention and Control (CSCNDPC) with wider mandates. Another key policy framework is the National strategy for Natural Disaster Prevention, Response and Mitigation (2008-2020). It places strategic focus on hazard monitoring, forecasting and early warnings, relocation and safe resettlement for populations inhabiting hazard-prone areas, risk-informed development with standards and building codes, as well as on capacity building of all DRM staff throughout the country.

Furthermore, the government has enforced a hierarchical structure extending down to village levels, forming a multi-layered disaster risk governance comprising the provincial, district and communal DRM authorities, namely the Provincial Committee for Flood and Storm Control (PCFSC), District Committees for Flood and Storm Control, and the Commune Committees for Flood and Storm Control. At commune levels, chairman of the Commune People's Committee, also assumes the role of the Head of Disaster Risk Management Board. Also, the governments work in harmony with non-government counterparts and social organizations, including Viet Nam Women's Union (VWU) with an estimated 13 million members (CFE-DM, 2018), Farmers' Union, the Red Cross Communal offices.

In 2017, the government also highlighted the need to unify efforts across existing authorities. For this purpose, the Disaster Management Center and the Technology Transfer Center merged into a single agency – the Disaster Management Policy and Technology Center (DMPTC) – operating under the auspice of the Viet Nam Disaster Management Authority.

The center's mandates encompass a wide range of efforts from technical services and policy planning to the coordination of functions related to DRR. Trainings are also main responsibilities of the center, seeking to enforce the capacity to advise on DRR mainstreaming and risk-informed development (DMPTC, 2015).

Table 1. Viet Nam's legislative plans and policies intended to improve disaster risk reduction and climate resilience

IMPLEMENTATION	PLAN/POLICY	SCOPE	PURPOSE
CENTRAL COMMITTEE OF STORM AND FLOOD CONTROL (CCSFC)	Decree No. 168-HDBT (May 19, 1990) of the Council of ministers	National, Provincial, District, Community	Established and outlined the tasks of the Central Committee of Storm and Flood Control (CCSFC), and committees and sectors at all levels
CENTRAL COMMITTEE OF STORM AND FLOOD CONTROL (CCSFC)	National strategy for natural disaster prevention, response and mitigation 2008 to 2020	National, Provincial	Identifying and outlining measures to prevent and mitigate major floods, landslides and other prevalent hazards in the country
PROVINCIAL AUTHORITIES	Provincial Action plans to implement the National DRM Strategy	Provincial	DRR actions and activities to be implemented by provincial authorities, aligned with the national strategy
CENTRAL COMMITTEE OF STORM AND FLOOD CONTROL (CCSFC)	Law on Disasters Prevention 2014	National, Provincial, Commune	Established legal basis for ministries and localities to implement effective measures for the prevention of natural disasters including floods, flash floods and landslides
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT	Community awareness raising and community-based disaster risk management (CBDRM) (2009) Prime Minister Decision No. 1002/ QD-TTg	Provincial, District, Communities	Intending to improve public awareness and community engagement in DRM through CBDRM approach

Priority 3. Investing in Disaster Risk Reduction for Resilience For a country highly prone to hydro-meteorological hazards, mainstreaming flood risk reduction and other mitigation measures requires massive investments in Viet Nam. Increasing impacts of changing climate, including inundation, intense rainfall, coastal erosion and saline intrusion all call for effective public risk financing to implement protective structural mitigation measures (from adequate drainage to flood barriers) in river basins, coastal zones and urban areas. Investments targeted towards improving critical infrastructure is also required, from roads to bridges to critical facilities such as water treatment plants and hydropower dams.

Also, it must be acknowledged that potential damages and losses caused by recurrent hazards and climate change over the years could exceed Viet Nam's financial capacities to recover and rebuild. Even now, the current resources are only able to meet 21 percent of the

funds required for reconstruction and recovery (World Bank, 2018). Similarly, macroeconomic development can be compromised in the short-term future. It has been estimated that major disasters occurring in the country could cause a loss of over 4 percent of the GDP in the case of a major disaster, and this is likely to be athe case in which projections indicate that Viet Nam has a 40 percent chance of experiencing an event with economic losses exceeding US$ 6.7 billion during the next 50 years (World Bank, 2018). This reaffirms the pressing need for investing in resilience, which has received considerable support from international development partners.

However, modernization of existing risk reduction and early warning instruments, infrastructure and dam retrofitting programs have received significant funding. For example, the World Bank invested US$ 1.7 billion targeting aforementioned improvements during the past decade (World Bank, 2018). Other major programs, including the City Resilience Program (Phases I and II), Supporting Resilience of Critical Infrastructure Investments in Viet Nam, and the Enhancing Resilience of Mekong Delta Secondary Cities (GFDRR, 2019) have focused on integrating risk-informed planning, drawing funds from Green Climate Fund (GCF) supporting adaptation actions and costal resilience.

As indicated in the Intended Nationally Determined Contribution (INDC), financial shortfalls for adaptation measures are likely and anticipated, and the national budget is projected to cover about one third of the overall financial needs. Thus, international support and private sector investments will be required to meet funding gaps (The Government of Viet Nam, 2015). These uncertainties pose significant challenges in guaranteeing adequate funding for disaster risk financing as well. However, initiatives such as the ADB's project targeting cities of Can Tho and Hue City could be mainstreamed to strengthen overall risk financing in Viet Nam. The project sought to review budgeting provisions to further integrate risk reduction, and brought climate projections into cost benefit analyses, which can at least alleviate the technical burdens for city authorities (ADB, 2015).

Priority 4. Enhancing Disaster Preparedness for Effective Response to "Build Back Better" in Recovery, Rehabilitation and Reconstruction In terms of early warnings, Viet Nam has made significant progress in improving existing systems and setting up new technological solutions for hazard forecasting and monitoring. Such pathway was mandated in the National Strategy for Natural Disaster Prevention, Response and Mitigation (2007-2020), which highlighted the importance of strengthening forecasting of flooding, storms, droughts, earthquakes and tsunamis. For example, the pathway has led to the development of nationwide capacity that now facilitates the dissemination of storm warnings 72 hours in advance (IFRC, 2014). Similarly, the DRM Law of 2014 mandates mainstreaming the development of contemporary warning systems for all-natural hazards, building upon existing good practice. Forecasting of hydrometeorological hazards was assigned to the National Center for Hydro-meteorological Forecasting (NCHMF) and the Viet Nam Hydro-Meteorological Service (VHMS) under MONRE, while the Viet Nam Academy of Science is responsible for building the network of seismographs and collecting information from both domestic and foreign sources for early warnings regarding tsunamis and seismic activity. Tangibly, the dissemination of warning messages is operated through public media, and where necessary, warnings are broadcasted in languages of ethnic minorities (IFRC, 2014).

In term of hazard monitoring, the hydrometeorological hazard forecasting system has improved considerably in the recent years. The system is now equipped with radar technology, comprising 18 radars and 18 stations for storm tracking and monitoring. A multi-transmission system that allows synchronizing data from regional, provincial and local

stations to be transferred between forecasting facilities has also been established. However, for more localized hazards, especially flooding and flash floods, there is still a need to expand the monitoring systems. Establishing flash flood detection and warning systems is indeed a challenge given the unpredictable nature of said hazard. However, Quang Nam Province has been implementing a novel Flash flood Monitoring and Early Warning System using M2M and cloud computing technology with the support of technical partners, which could be mainstreamed nationwide as well (Government of Viet Nam, Waseda University & the KDDI foundation, 2015).

However, at the local levels, disseminating early warnings remains a challenge. Still, numerous initiatives have sought to mitigate the issues by standardising community radios, door knocks, and community announcements as a part of the wider CBDRM process. These have been further enhanced by using mobile alert SMS to reach the last miles in coastal communities of Thua Thien Hue, Quang Nam, and Da Nang, with support by UNICEF, government agencies and mobile companies (Save the Children International, 2016).

In terms of disaster response, the Central Committee for Natural Disaster Prevention and Control (CCNDPC) coordinates activities with the National Committee for Incident, Disaster Response, Search and Rescue (VINASARCOM). Jointly, they have the responsibility over managing immediate search and rescue, as well as to oversee and provide guidance to localities during the response and emergency operations. Also, having the capacity to deploy military units, VINASARCOM will assume charge of incident command in disaster events that requires military support (CFE-DM, 2018). Response operations are also supported by non-governmental organizations such as the Viet Nam National Red Cross (VNRC), with well-established countrywide branches and volunteer networks. VNRC is the leading professional humanitarian organization in the country, with experience in disaster relief and humanitarian services, and it is currently active in all 63 provinces across the country (CFE-DM, 2018).

Finally, building back better is required to reduce the impacts of future disasters by reducing the original factors contributing to vulnerabilities and damages. It is also a key for ending the cycles of poverty and vulnerability globally. In Viet Nam, the DRM Law does include provisions for post-disaster reconstruction with the intention to integrate DRR however, these efforts are not widely integrated into other policies and lack linkages to sustainable development (Government of Viet Nam, 2015). Work is largely done on an ad-hoc basis, which limits the efficacy of building back better nationwide however are in place including through UNDP which has provided significant financial assistance targeting recovery programming in the country, and in 2018, provided comprehensive training for national disaster management centers in countries across the world, including Viet Nam (UNDP, 2018).

4. Coherence with Sustainable Development Goals and the Paris Climate Agreement

Disaster management, CCA and sustainable development share similar characteristics, overlapping strategic objectives and synergies which should be harmonized across various policies to guarantee maximum efficacy. Separate legislative provisions, strategies, frameworks and plans targeting DRR, CCA and sustainable development constitutes to redundancies, repeated efforts and thus, wasted resources. Existing DRM frameworks should be revised in accordance to the post-2015 development agenda to identify how countries could best prioritize and synchronize their domestic efforts vis-à-vis ongoing projects, available funding, risks and vulnerabilities to utilize the highest potential for holistic DRM.

In Viet Nam, risk informed development has been brought to the forefront, and the interconnectedness of the development targets across sectors have been acknowledged. For example, Viet Nam's Socio-Economic Development Plan (SEDP) 2011-2015, anticipated challenges due to disasters and climate change, and considered poverty reduction, resilience building and climate adaptation as key concerns for achieving its intended objectives. Similarly, the current SEDP 2016-2020, and the long-term socioeconomic development strategy (SEDS), 2011–2020 also articulate environmental sustainability and socially equitable economy, aligned with the SDGs. In 2017, a National Action Plan was launched to further the tangible implementation of the SDGs, which also integrated disaster risk reduction DRR and CCA as among the most important priority actions (Government of Viet Nam, 2017).

For climate change-related concerns, the National Committee on Climate Change is the main policy-making authority, chaired by the Ministry of Natural Resources and Environment (MONRE), that formulates strategic plans for climate change mitigation and adaptation. It also oversees and coordinates the implementation of programs and action plans, in alignment with the National Strategy and global policy. The National Climate Change Strategy 2011 and National Action Plan on Climate Change 2012-2020 are the main instruments outlining climate change interventions, along with the INDC 2015 which demonstrate explicit linkages to DRR as well. The plan includes key sectors from water management to agriculture, industry, transportation and energy to urban development, and MONRE has been assigned as the focal agency for coordinating activities across different ministries. For specific sectoral concerns, these wider aspirations are supported by targeted efforts. They include the Integrating Agriculture in National Adaptation Plans (2020-2030) program, or NAP-Ag, under which the Ministry of Agriculture and Rural Development (MARD) seeks to mainstream adaptation actions into planning and budgeting processes of the agriculture sector. It is a transnational initiative, co-led by the UNDP and FAO, financed by the Government of Germany (FAO, 2019).

Overall, the country's long-term vision is now largely aligned with the SDGs, Sendai Framework and the Paris Climate Agreement, and Viet Nam has made progress in integrating these aspirations regionally, including in the Mekong Delta. The Government Resolution 120 /NQ-CP on Sustainable and Climate-Resilient Development of the Mekong Delta of Viet Nam dated November 17, 2017, articulates the country's commitment towards achieving a sustainable, safe and prosperous Mekong Delta, based on

greening and diversifying economic activities, while investing in mitigating climate change. A balance is sought out by enforcing structural protective measures, socio-economic growth and the sustainable use of natural resources (Government of Viet Nam, 2017).

Table 2. Some of the synergies between international agreements and different policies and commitments of Viet Nam in various sectors.

Sectoral Aim	Policies/programs with potential links to Sendai Framework for Disaster Risk Reduction	Policies/programs with potential links to Sustainable Development Goals	Policies/programs with potential links to the Paris Climate Agreement or Environment
National Development	Mekong Delta Plan (2018) Master plan on water drainage in the Mekong river delta key economic region through 2020	Socio-economic development plan 2016-2020 Sustainable Development Strategy 2011-2020 National Action Plan for the implementation of the 2030 Sustainable Development Agenda 2017 Industrial Development Strategy through 2025, vision to 2035	National Target Program to respond to climate change (NTPRCC) 2012 – 2015 National strategy on climate change
Agriculture	Integrating Agriculture in National Adaptation Plans (2020-2030) or NAP-Ag	Agriculture restructuring plan 2017-2020	Integrating Agriculture in National Adaptation Plans (2020-2030) or NAP-Ag
Disaster and Climate Risk Reduction	National Strategy for Natural Disaster Prevention, Response and Mitigation 2007- 2020	Sustainable Development Strategy for 2011-2020	National action plan on climate change 2012-2020 National strategy on environment protection to 2020, with visions to 2030
Vulnerability Reduction	National Strategy on Gender Equality 2011-2020 (2012)	Nation Target Programme on New Rural Development (NTM) 2010 National Strategy on Gender Equality for the 2011-2020 period	Law on Environment Protection (2014) Power Development Plan VIII Strategy on cleaner industrial production to 2020
Urban Development	Water supply planning of HCM City till 2025 Master plan on water supply in the Mekong river delta key economic region through 2020	Master Plan Orientation for Viet Nam's Urban System Development to 2025 with Vision to 2050 Metropolitan Planning, (or Regional Planning) according to Law on Construction 2013	Land Law (2013) National Land Policy (2018)

5. Issues in the Implementation of Disaster Risk Reduction and Climate Policy

Numerous issues still hinder the tangible implementation of the comprehensive policy framework the government of Viet Nam has devised to respond to the contemporary challenges posed by climate change and cycle of hazards in the country. Albeit subjective, some of the main concerns related to implementation and mainstreaming of the development vision at the sub-national levels are highlighted here.

Understanding of the complex interlinkages between development, human systems, the environment, climate and disaster risk still remains limited in the country. Emerging risks of slow onset hazards, in particular, add to the challenges due to their nature that is difficult to estimate, track and predict, especially in areas which lack comprehensive monitoring systems, and thus, data. Achieving sustainable development across the country with varying degrees of capacity and resources requires more targeted efforts to identify areas in need of support, and calls for cross-agency collaboration to synergize existing efforts for maximizing benefits from on-going initiatives. Furthermore, despite the on-going ideological shift which seeks to reinforce harmonized disaster and climate risk reduction policymaking, on the ground, approaches are often response focused, and lack capacity to conduct operations as envisaged at the national level (World Bank & GFDRR, 2017).

In this context, limited human resources at local levels are noted as the main challenge in translating climate change policies into action, and when seeking to integrate them into sub-national development planning. Moreover, areas where DRR and CCA overlap, the synergies are often not well-recognized due to aforementioned problems relating to capacity (National Climate Change Committee, 2013). At national level, the inter-ministerial bodies responsible for planning and implementation often lack necessary authority and financial resources. Thus, horizontal and vertical coordination requires improvement to fully materialize the DRR and CCA mandates at all levels (World Bank & GFDRR, 2018).

Finally, limited funding constrains many of the efforts to further enhance resilient and sustainable development. A report by the Asian Development Bank highlights significant funding gaps in DRR, based on risk modelling and climate projections vis-à-vis existing financial capacity and available DRR budgeting provisions (ADB, 2015). It highlights that contingency reserve funds are still utilized as a major source for all disaster-related funding, provided from the state budgets, with certain amounts set aside from central, provincial, and local governments. The overall resources correspond to about 2-5 percent of the annual budgets to support various contingency needs. However, the majority of these contingency funds are spent in emergency situations requiring short-term liquidity, and may not be utilized for reconstruction, nor to be accrued or retained for the next budget cycle – thus constituting shortfalls in localized DRR (ADB, 2015). Moreover, budget deficits are also prevalent barrier achieving the envisaged SDG targets in the five key sectors (education, healthcare, transportation, rural area development, and water supply) by 2030.

6. Stakeholder Analysis

As one of the world most vulnerable countries to climate change and disasters globally, non-governmental organizations, international partners and donors have an important role in furthering DRR and climate resilient development in Viet Nam. Currently, numerous stakeholders from development partners to technical agencies are working with the government on issues including water management, flood resilience and environmental protection. They include Japan International Coordination Agency, Food and Agriculture Organization of the United Nations, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and Declares. Bilaterally, the Vietnamese–Netherlands cooperation initiative conducted in the Mekong Delta region has been instrumental in driving the momentum of managing sustainable water use, and it has helped to improve strategic partnerships on wider CCA between the two countries. The MONRE and MARD are acting as the focal agencies for international collaborations.

Multilaterally, Viet Nam is a member of the Mekong River Commission (MRC), a platform for Mekong river water management. Lower Mekong hydro-meteorological data and information sourced from sub-national level and regional organizations, managed by the MRC, supports in the management of water-related issues, as well as in the monitoring of flood and drought hazards. SERVIR Mekong program is among the most important contemporary interventions, seeking to integrate satellite data, space technology and open data into a system capable of projecting climate-related changes and risks of hydrometeorological hazards in the region. It is a partnership of USAID, NASA, and regional organizations of the Lower Mekong region, co-led and implemented by ADPC with the support of Stockholm Environment Institute, Spatial Informatics Group and Deltares. These transboundary initiatives are crucial for a country dependent on the river system traversing through six countries, influenced by changes and anthropogenic stressors from each of the member nation.

International organizations and local non-governmental bodies also provide extensive support to community-based programs. More than 17 agencies have engaged locally driven DRM in 23 provinces, working directly with the local DRM functionaries, e.g. local committees for flood and storm control, search and rescue, or the local people's committee with the participation of local residents. The agencies include Asian Disaster Preparedness Center, World Vision, Netherlands Red Cross, Spanish Red Cross, Care International in Viet Nam, Centre for International Studies and Cooperation (CECI), Save the Children Alliance, International Federation of Red Cross and Red Crescent Societies (IFRC), Church World Services, UNDP, World Bank, GIZ, ActionAid, and Oxfam (Nguyen, et al., 2013). In terms of humanitarian action, the Viet Nam Red Cross Society with the help of IFRC and Partner National Societies (PNS) is well established and working in the communes to strengthen disaster response activities and resource mobilization to assist vulnerable people. Communities themselves are important stakeholders in mainstreaming DRR and CCA nationwide, due to which working through consultations and agreements is elemental for furthering whole-of-society approaches in Viet Nam.

Also, Viet Nam has been proactive in recognizing and promoting gender equality and women's leadership on the domains of disaster and climate change. These efforts have been built on a government's decree issued in September 2013, which provides an official space for the Women's Union in decision-making boards of the Committee for Natural Disaster Prevention and Control. This helps in ensuring the representation of women as

key stakeholders in risk management and strives towards providing opportunities for meaningful participation at the national level (UN Women, 2017).

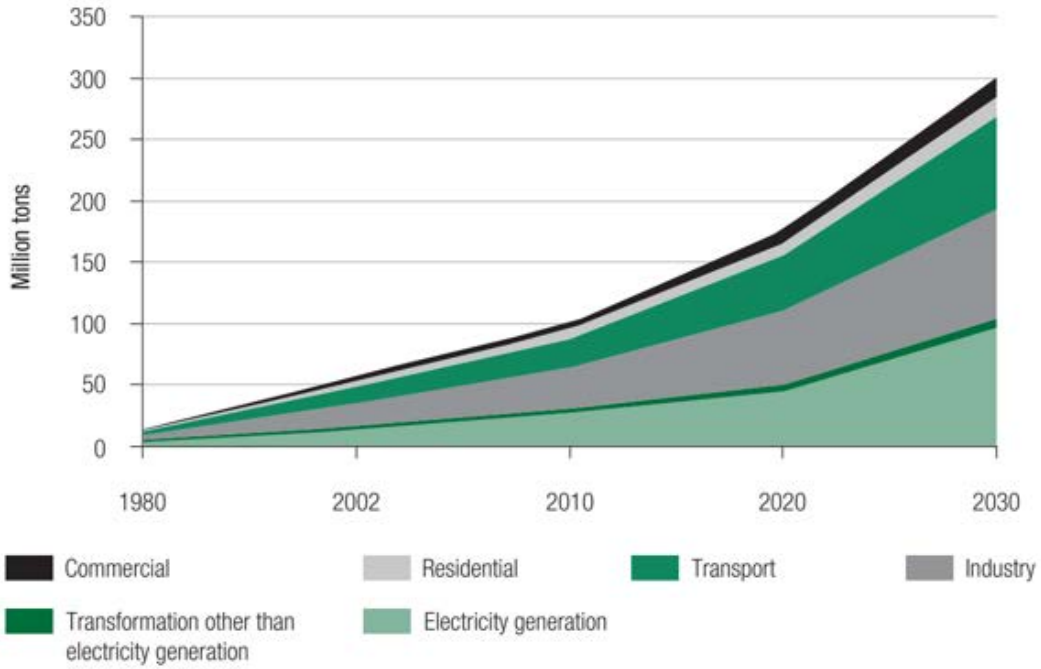
Finally, acknowledging media organizations as stakeholders in disaster and climate risk management has been increasing in the country. They have responsibilities in raising public awareness about the risks affecting Viet Nam, but also alert local communities on response actions taken by the governments, as well as work in bringing local issues to wider audiences. In this context, media organizations can help in cultivating the public's interest and concern on the state's capacity to deliver timely and effective disaster services and interventions, which further reinforces the transparency and accountability of local authorities on their functions and responsibilities (DIIS, 2016).

7. Future Priorities

7.1 Challenges

Firstly, achieving and maintaining the envisaged development on a resilient, sustainable, equitable and climate adaptive pathway remains a critical challenge. For example, while Viet Nam aims to cut 8 percent of its total emissions between 2021-2030, the energy sector of the country still largely relies on coal and thermal power, which generate about 72 percent of the country's emissions (Mekong Delta Plan, 2018). Overall, the energy intensity of the country has increased 4 percent annually since 1990 (Figure 8). They also contribute to considerable amount of air pollution, and in some regions, to the degradation of water quality. Attempts to increase the share of renewable energies in the total output is articulated in the Power Development Plan VIII. However, to achieve these intentions while the overall demand for energy keeps increasing on par with the rate of development and economy, significant investments and efforts are still required in the sector (Mekong Delta Plan, 2018).

Figure 8. Carbon Dioxide Emissions in Viet Nam by Sector, 1980–2030 (ADB, 2013).



Yet, the progress review of the Mekong Delta Plan in 2019 noted the lack of capital as a major shortfall. Alongside greening the economy and industrial sector, effective risk financing mechanisms are also required for strengthening resource mobilisation at the local levels while keeping in mind the contextual needs in terms of climate change adaptation and sustainable development. Similarly, prioritizing investments for sustainable infrastructure development and sectoral investment still requires enhancement (Ministry of Planning and Investment, 2019).

Also, the agriculture sector and related sub-sectors, not to mention millions of people dependent on them, are under adverse pressures from extreme weather events. If one examines the geographical distribution of risks, coastal communities and their livelihoods are among the hardest hit, demonstrating the significant disparities in the climate change impacts across the country. When combined to environmental degradation and the loss of natural resources – partly as a result of anthropogenic stressors – the compounding effects of the loss of natural space severely endangers coastal zones and settlements nearing floodplains areas. The complex interaction of the ecological systems and human activities have had negative implications, acceleration of which could massively increase climate risks in the worst affected areas (Takagi, 2015). Thus, managing and reducing vulnerabilities, greening growth and managing the sustainable use of resources across the country are increasingly necessary to guarantee that development does not occur as a trade-off for lack of resilience and loss of habitable space.

Also, issues related to risk management are magnified in urban regions following the rapid organic expansion of cities. Given Viet Nam's reported high level of exposure to natural hazards, incorporating resilience into development and growth in the country is essential particularly in reducing the creation of new risk. However, investing in engineering solutions and structural interventions for risk reduction are only part of the solution. Embedding soft measures and alternative strategies, including land subsidence control, ecosystem-based solutions and poverty reduction are also part of maintaining and developing urban spaces to build their resilience against hydrometeorological hazards (WorldBank & GFDRR, 2018). In this context, it must be noted that safeguarding critical facilities, especially road and transportation network from the impacts of disasters is also limited, facing the fact that Viet Nam has absorbed about US$ 6 billion in damages over the last 20 years.

7.2 Priority Issues

Among the first priorities for Viet Nam is to improve the management of water resources to improve resilience against hydrometeorological hazards and climate risks, alongside mainstreaming adaptation measures and sustainable growth under the post-2015 development agenda. However, to achieve such aspirations, significant investments are required to support capacity development, human resources, as well as coordination and monitoring mechanisms. Similarly, enhancing the technical capacity to facilitate the development of detailed and contextualized disaster and climate projections is necessary, and it would also further the efforts to prioritize already limited resources to regions and localities where they are most needed. Also, given the complexity of the river systems in the country, an integrated approach is required with the capacity to assess the connectivity of river basins and water cycles vis-à-vis sectoral needs and current development (including hydropower dams) to inform decision-making. In this context, a balance should be sought out between rates of industrialization, growth and the need to protect the environment, enforce social equity and ensure inclusive development. This is directly correlated with the potential success to achieve risk reduction and climate adaptation as whole-of-society endeavours.

These issues a particularly prevalent in the rural regions, and require heightened focus to improve the resilience of the agricultural sector not only against climate change, but also against the cycle of hazards which affects the country annually. Indeed, given the magnitude of the projected changes in the regional climate in the midterm future, not to mention the high disaster risks, it is crucial to begin identifying locally-effective (and driven) solutions in areas where vulnerability characterizes the lives of subsistence farmers and others reliant

on the stability of the wider ecological system. As part of this, it will be essential that disaster risk data being collected continues to be strengthened and made available to all relevant stakeholders particularly at the local level to inform development and growth activities. In harmony with the government, non-governmental organizations, local leaders and the communities themselves, solutions should cater for the specific needs and talents of the most affected localities, in recognition of the strengths and knowledge they have that could support and contribute to the wider efforts of combatting disasters and climate change.

It is also important for Viet Nam to move towards the integration of climate and disaster risks into urban development and land-use planning processes. Supported by a comprehensive policy framework, the government has facilitated action towards improving resilience of cities and urban spaces. Such initiatives include the Urban Environment and Climate Change Adaptation Project to improve climate resilient infrastructure and urban environmental management and adaptation in three coastal cities of Dong Hoi (Quang Binh province), Hoi An (Quang Nam province), and Sam Son (Thanh Hoa province) (ADB, 2019). Hue City is taking part under the Green Project until 2020, and has started experimenting the mainstreaming of multi-disciplinary measures for improving climate adaptation with development partners. By focusing on the expansion of green-blue infrastructure (GBI), and the integration of nature-based solutions for urban planning, it is hoped that these initiatives could be replicated elsewhere as well. As such, investing in the capacities of the provincial and local stakeholders responsible over urban development is of paramount importance given the contemporary challenges of the 21st century.

8. References

1. ADB, 2013. Viet Nam Environment and Climate Change Assessment, Metro Manila: ADB.
2. ADB, 2015. Strengthening City Disaster Risk Financing in Vietnam, Metro Manila: Asian Development Bank.
3. ADB, 2018. ADB Project to Boost Transport, Economic Development in Viet Nam's Mountainous Northwest, Metro Manila: ADB.
4. ADB, 2018. ADB Project to Modernize Irrigation Systems, Improve Agricultural Productivity in Viet Nam. [Online] Available at: https://www.adb.org/news/adb-project-modernize-irrigation-systems-improve-agricultural-productivity-viet-nam [Accessed December 8, 2019].
5. ADB, 2019. Asian Development Outlook 2019: Strengthening Disaster Resilience, Metro Manila: Asian Development Bank.
6. ADB, 2019. Poverty in Viet Nam. [Online] Available at: https://www.adb.org/countries/viet-nam/poverty [Accessed December 6, 2019].
7. ADB, 2019. Viet Nam: Urban Environment and Climate Change Adaptation Project. [Online] Available at: https://www.adb.org/projects/43237-013/main#project-pds [Accessed December 12, 2019].
8. Aga Khan Foundation, 2007. Aga Khan Historic Cities Programme, Kabul: Aga Khan Foundation.
9. Arouri, M., Youssef, A. B. & Nguyen-Viet, C., 2015. Natural Disasters, Household Welfare, and Resilience: Evidence from Rural Vietnam. World Development, Issue 70, pp. 59 - 77.
10. ASEAN-ROK Cooperation Fund, 2017. Building Resilience for Sustainable ASEAN from Water-Related Disasters, s.l.: s.n.
11. ASEAN, 2015. ASEAN Statistics in Focus. [Online] Available at: https://pserver.gso.gov.vn/data-and-statistics/2019/04/aseanstatistics-in-focus-vietnam-population-exceeded-90-million-people-in-2014/
12. Available at: https://www.worldbank.org/en/news/speech/2018/03/29/vietnam-national-conference-on-disaster-risk-management [Accessed December 11, 2019].
13. Bangalore, M., Smith, A. & Veldkamp, T., 2019. Exposure to Floods, Climate Change, and Poverty in Vietnam, s.l.: s.n.
14. CFE-DM, 2018. Vietnam: Disaster Management Reference Handbook, s.l.: s.n.
15. Chinowsky, P., Schweikert, A., Strzepek, N. & Strezepek, K., 2015. Road Infrastructure and Climate Change in Vietnam. Sustainability, 7(5), pp. 5452-5470.
16. CSO, 2017. Afghanistan Living Conditions Survey 16-17, Kabul: Central Statistics Organization.
17. DHI, 2015. MIKE Powered by DHI User Group Meetings in Hanoi and Ho Chi inh City, Vietnam. [Online] Available at: https://www.mikepoweredbydhi.com/global/news/2015/10/mike-powered-by-dhi-user-group-meetings-in-hanoi-and-ho-chi-minh-city [Accessed December 10, 2019].
18. Diez, R. L. &. J. R., 2018. Exposure of manufacturing firms to future sea level rise in Ho Chi Minh City, Vietnam, s.l.: s.n.
19. DIIS, 2016. Understanding sub-national climate governance, s.l.: DIIS: Danish Institute for International Studies.
20. DMPTC, 2019. Mekong Delta subsiding at alarming rate: workshop. [Online] Available at: http://dmc.gov.vn/news-detail/mekong-delta-subsiding-at-alarming-rate-workshop-cd9782-32.html?lang=en-US [Accessed December 8, 2019].
21. DMPTC, 2019. Policies, legislation on climate change to be amended. [Online] Available at: http://dmc.gov.vn/news-detail/policies-legislation-on-climate-change-to-be-amended-cd9783-32.html?lang=en-US [Accessed December 5, 2019].
22. Elalem, S. & Pal, I., 2015. Mapping the vulnerability hotspots over Hindu-Kush Himalaya region to flooding disasters. Weather and Climate Extremes, Volume 8, pp. 46-58.
23. Ellis, P. & Roberts, M., 2016. Leveraging Urbanization in South Asia, Washington D.C: World Bank.
24. EU/ECHO, 2016. Vietnam: assisting drought-affected farmers in the Central Highlands. [Online] Available at: https://ec.europa.eu/echo/blog/vietnam-assisting-drought-affected-farmers-central-highlands_en
25. FAO, 2019. Integrating Agriculture in National Adaptation Plans (NAP-Ag). [Online] Available at: http://www.fao.org/in-action/naps/news-events/detail/en/c/1201977/
26. FloodList, 2019. Vietnam – High Tides and Rising Rivers Flood Cần Thơ. [Online] Available at: http://floodlist.com/asia/vietnam-high-tides-rivers-flood-can-tho-october-2019
27. General Statistics Office of Viet Nam, 2018. Statistical summary book of Vietnam, s.l.: s.n.
28. General Statistics Office of Viet Nam, 2018. Statistical Yearbook of Vietnam 2018, Hanoi: s.n.
29. GermanWatch, 2019. GLOBAL CLIMATE RISK INDEX 2019 Who Suffers Most From Extreme Weather Events? Weather-related Loss Events in 2017 and 1998 to 2017, Berlin: GermanWatch.
30. Germanwatch, 2019. Global Climate Risk Index 2020, Berlin: Germanwatch.
31. GFDRR & World Bank, 2017. Disaster Risk Profile Afghanistan, Washington D.C.: GFDRR.
32. GFDRR, 2019. Vietnam. [Online] Available at: https://www.gfdrr.org/en/vietnam
33. Ginnetti, J. & Lavell, C., 2015. The Risk of Disaster-Induced Displacement in South Asia, Geneva: IDMC.

34. GoN, 2015. National progress report on the implementation of the Hyogo Framework for Action (2013-2015), s.l.: s.n.
35. Government of Viet Nam, 2015. National Progress Report on the Implementation of the Hyogo Framework for Action (2013-2015), s.l.: Government of Viet Nam.
36. Government of Viet Nam, 2017. Government Resolution 120. [Online] Available at: https://www.mekongdeltaplan.com/regional-coordination/government-resolution-120 [Accessed December 12, 2019].
37. Government of Viet Nam, 2017. National Action Plan for the implementation of 2030 sustainable development agenda, Hanoi: Government of Viet Nam.
38. Government of Viet Nam, Waseda University & the KDDI foundation, 2015. Study of Flashflood Monitoring and Early Warning System using M2M and Cloud Computing Technology (J2), s.l.: s.n.
39. Government of Viet Nam, 2015. Intended Nationally Determined Contribution of Viet Nam, s.l.: s.n.
40. Government Portal, 2019. About Vietnam. [Online] Available at: http://chinhphu.vn/portal/page/portal/English/TheSocialistRepublicOfVietnam/AboutVietnam/AboutVietnamDetail?categoryId=10000103&articleId=10000505 [Accessed December 5, 2019].
41. Government Portal, 2019. Ethnic groups in Vietnam. [Online] Available at: http://www.chinhphu.vn/portal/page/portal/English/TheSocialistRepublicOfVietnam/AboutVietnam/AboutVietnamDetail?categoryId=10000103&articleId=10002652 [Accessed December 5, 2019].
42. Government of Viet Nam, 2018. Support to six Northwest mountainous provinces in natural disaster adaptation. [Online] Available at: https://reliefweb.int/report/viet-nam/support-six-northwest-mountainous-provinces-natural-disaster-adaptation
43. Hamidazada, M., Cruz, A. M. & Yokomatsu, M., 2019. Vulnerability Factors of Afghan Rural Women to Disasters. International Journal of Disaster Risk Science, pp. 1-18.
44. Hoa, X., 2018. Super Typhoon Mangkhut to let off Vietnam lightly. [Online] Available at: https://e.vnexpress.net/news/news/super-typhoon-mangkhut-to-let-off-vietnam-lightly-3810755.html
45. Hudson, P. &. P. M. &. H. L. &. L. R. &. H. T. &. B. P., 2018. Gender differences in flood resilience in central Vietnam (policy brief), s.l.: s.n.
46. IFAD, 2010. Vietnam: Environmental and Climate Change Assessment, s.l.: s.n.
47. IFRC, 2014. Viet Nam: Country Case Study Report: How Law and Regulation Support Disaster Risk Reduction, s.l.: s.n.
48. IMF, 2018. Five Charts Explain Vietnam's Economic Outlook. [Online] Available at: https://www.imf.org/en/News/Articles/2019/07/11/na071619-five-charts-explain-vietnams-economic-outlook
49. IOM, 2016. Assessing the Evidence: Migration, Environment and Climate Change in Vietnam, s.l.: s.n.
50. JICA, 2015. Country Report Vietnam, Tokyo: JICA.
51. JICA, 2018. Data Collection Survey on Strategy Development of Disaster Risk Reduction and Management in the Socialist Republic of Vietnam, s.l.: Japan International Cooperation Agency.
52. Leitold, D. R. & Revilla, J., 2018. Exposure of manufacturing firms to future sea level rise in Ho Chi Minh City, Vietnam, s.l.: s.n.
53. Mekong Delta Plan, 2018. UN Climate Change report launched in Vietnam. [Online] Available at: https://www.mekongdeltaplan.com/news/archive-2017/14/2018-10-11/un-climate-change-report-launched-in-vietnam [Accessed December 12, 2019].
54. Ministry of Planning and Investment, 2019. Mekong Delta should shift towards adapting to climate change: PM. [Online] Available at: http://www.mpi.gov.vn/en/Pages/tinbai.aspx?idTin=43752&idcm=92 [Accessed December 12, 2019].
55. National Disaster Management Authority, 2013. Badakhshan Provincial Disaster Management Plan. s.l.:National Disaster Management Authority .
56. National Environmental Protection Agency, 2016. Afghanistan: Climate Change Science Perspectives, Kabul: National Environmental Protection Agency.
57. Nguyen, H. et al., 2013. Community based disaster risk management in Vietnam. Forms of Community Participation in Disaster Risk Management Practices, pp. 119-131.
58. NRRC, 2014. Flagship 4: CBDRM, s.l.: s.n.
59. OECD, 2014. OECD Green Growth Studies Towards Green Growth in Southeast Asia, s.l.: OECD Green Growth Studies.
60. Office of the President, 2016. Constitutional Authorities. [Online] Available at: https://president.gov.af/en/constitutional-authority/ [Accessed September 22, 2019].
61. Peters, K., 2019. Disaster Risk Reduction in Conflict Contexts: A Briefing for Policy-makers, s.l.: ODI & GIZ.
62. Phach, P. V., 2012. Sea level change and its impact on the Mekong Delta, South Vietnam, s.l.: s.n.
63. Pilarczyk, K. &. N. N., 2005. Experience and Practices on Flood Control in Vietnam. Water International, Volume 30, pp. 114-122.
64. PreventionWeb, 2014. Basic Country Statistics and Indicators (2014). [Online] Available at: https://www.preventionweb.net/countries/vnm/data/
65. PreventionWeb, 2014. Viet Nam Disaster Risk Profile. [Online] Available at: https://www.preventionweb.net/countries/vnm/data/ [Accessed February 17, 2020].

66. Shaw, Rajib & Linh, Tran. (2020). COVID-19 initial preparedness and response in Vietnam during the first six months of the pandemic and the lessons for Sendai framework implementation Rajib Shaw. International Journal of Disaster Resilience in the Built Environment. ahead-of-print. 10.1108/IJDRBE-07-2020-0080.
67. Save the Children International, 2016. Early warning system innovations in Viet Nam: SMS technology and education. [Online] Available at: https://www.preventionweb.net/news/view/49839 [Accessed December 11, 2019].
68. Schirmbeck, S., 2017. Vietnam's Environmental Policies at a Crossroads, s.l.: s.n.
69. Takagi, H. &. T. N. &. E. M. &. M. T. &. C. L. &. V. C., 2015. Coastal Disasters in Vietnam. 10.1016/B978-0-12-801060-0.00012-5..
70. Tatarski, M., 2018. New climate change report highlights grave dangers for Vietnam. [Online] Available at: https://news.mongabay.com/2018/10/new-climate-change-report-highlights-grave-dangers-for-vietnam/
71. The Government of Viet Nam, 2015. Intended Nationally Determined Contribution, s.l.: Government of Vietnam.
72. The Watchers, 2018. Over 1 500 houses damaged, farms devastated as hailstorm hits northern Vietnam. [Online] Available at: https://watchers.news/2018/04/16/over-1500-houses-damaged-farms-devastated-as-hailstorms-hit-northern-vietnam/ [Accessed December 6, 2019].
73. Tran, T. A., Tran, P. & Tuan, T. H., 2012. Review of Housing Vulnerability Implications for Climate Resilient Houses, s.l.: ISET .
74. UN Environment, 2019. Gasping for Air in Kabul, s.l.: UN Environment Programme.
75. UN Viet Nam, 2016. Viet Nam: Drought and Saltwater Intrusion Situation Update No. 4 (as of July 11, 2016), Hanoi: United Nations.
76. UN Women, 2017. In Viet Nam, women are leading disaster prevention and response. [Online] Available at: https://www.unwomen.org/en/news/stories/2017/5/feature-in-viet-nam-women-are-leading-disaster-prevention-and-response [Accessed December 12, 2019].
77. UNCTAD, 2018. UNCTAD and Vietnamese university to create a sustainable fisheries training centre. [Online] Available at: https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1680
78. UNDP, 2011. Vietnam: Sea-level rise could "displace millions", s.l.: UNDP.
79. UNDP, 2015. National progress report on the implementation of the Hyogo Framework for Action (2013-2015), s.l.: s.n.
80. UNDP, 2016. Viet Nam Drought and Saltwater Instrusion: Transitioning from Emergency to Recovery, s.l.: UNDP.
81. UNDP, 2018. Disaster Recovery: Challenges and Lessons, s.l.: UNDP.
82. UNDP, 2018. Human Development Indices and Indicators: 2018 Statistical Update Briefing note for countries on the 2018 Statistical Update Afghanistan, s.l.: UNDP.
83. UNDP, 2018. Typhoon Damrey Early Recovery Analysis Report: Viet Nam 2017, s.l.: s.n.
84. UNDP, 2019. Adapting Afghan Communities to Climate-Induced Disaster RIsks. [Online] Available at: https://www.adaptation-undp.org/projects/adapting-afghan-communities-climate-induced-disaster-risks [Accessed September 27, 2019].
85. UNDP, 2019. Human Development Report 2019 Inequalities in Human Development in the 21st Century Briefing note for countries on the 2019 Human Development Report, s.l.: UNDP.
86. UNDP, 2020. Vietnam's Climate Risk Index. [Online] Available at: http://eng.climaterisk.org.vn/ [Accessed March 24, 2020].
87. UNDRR, 2019. Global Assessment Report on Disaster Risk Reduction. Geneva: United Nations Office for Disaster Risk Reduction.
88. UNW-DPC, 2014. NDMP_Country Report: Drought Situations and Management in Vietnam, s.l.: s.n.
89. USDA Foreign Agricultural Service, 2019. African Swine Fever in Vietnam, s.l.: s.n.
90. VCAPS Consortium, 2013. Climate Adaptation Strategy: Ho Chi Minh City, s.l.: s.n.
91. VietNam News, 2016. Hail storm destroys crops, houses in northern provinces. [Online] Available at: https://vietnamnews.vn/society/294838/hail-storm-destroys-crops-houses-in-northern-provinces.html [Accessed December 6, 2019].
92. VietNam News, 2017. $18.2m project aims to improve flood management in central Việt Nam. [Online] Available at: https://vietnamnews.vn/environment/381804/182m-project-aims-to-improve-flood-management-in-central-viet-nam.html#DAkvVlFrePSR0MM3.97 [Accessed December 10, 2019].
93. VietNam News, 2017. Disasters a threat to VN development. [Online] Available at: https://vietnamnews.vn/environment/376860/disasters-a-threat-to-vn-development.html [Accessed December 6, 2019].
94. VietnamLaw, 2017. Current local administration system in Vietnam. [Online] Available at: http://vietnamlawmagazine.vn/current-local-administration-system-in-vietnam-6058.html
95. VietNamNews, 2018. Việt Nam meteorologists lead the way. [Online] Available at: https://vietnamnews.vn/opinion/425249/viet-nam-meteorologists-lead-the-way.html
96. World Atlas, 2018. What Are The Major Natural Resources Of Vietnam? [Online] Available at: https://www.worldatlas.com/articles/what-are-the-major-natural-resources-of-vietnam.html [Accessed December 5,

2019].
97. World Bank & GFDRR, 2018. Mainstreaming Disaster Resilience in Vietnam, s.l.: s.n.
98. World Bank, 2013. Vietnam: Strengthening Disaster Risk Management. [Online] Available at: Building Resilient Communities in Vietnam [Accessed December 11, 2019].
99. World Bank, 2018. Climbing the Ladder: Poverty Reduction and Shared Prosperity in Vietnam, s.l.: World Bank.
100. World Bank, 2018. Implementation Completion and Results Report No. ICR004223 (IDA-H6990), Kabul: World Bank.
101. World Bank, 2018. Vietnam National Conference on Disaster Risk Management. [Online]
102. World Bank, 2019. The World Bank In Vietnam. [Online] Available at: https://www.worldbank.org/en/country/vietnam/overview [Accessed December 5, 2019].
103. World Bank, 2019. Vietnam: Toward a Safe, Clean, and Resilient Water System, s.l.: s.n.
104. World Bank, 2019. World Bank Data: Viet Nam. [Online] Available at: https://data.worldbank.org/?locations=VN-XN [Accessed December 29, 2019].
105. World Bank & GFDRR, 2018. Mainstreaming disaster resilience in Vietnam: Engaging with communities to build resilience. [Online] Available at: https://reliefweb.int/report/viet-nam/mainstreaming-disaster-resilience-vietnam-engaging-communities-build-resilience [Accessed December 12, 2019].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