

CLIMATE RESILIENCE IN VIETNAM: AN ASSESSMENT IN METROPOLITAN REGIONS





Vietnam is one of the countries in the world most seriously affected by climate change. Vietnam's cities are growing quickly, bringing many benefits but also leading to new and increased risks of exposure to natural disasters and environmental change. Rapid urbanization, the risks associated with climate change, international economic and environmental trends require a resilience approach into urban planning and management as well as the development of more effective levels of cooperation and coordination between different agencies, both government and private sector beyond the administrative boundary of a city or a metropolitan area.

In this context, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Administration of Technical Infrastructure (ATI) – Ministry of Construction (MoC) is implementing the Programme „Flood Proofing and Drainage for Coastal and Mekong Cities of Vietnam for Adaptation to Climate Change“. This is a technical cooperation project between the Vietnamese and German Governments funded by Federal Ministry for Economic Cooperation and Development and the State Secretariat for Economic Affairs – Switzerland. The Programme is aimed at the improvement of capacities of national and local authorities as well as urban population to improve resilience and adaptation to urban floodings in the

course of climate change.

ATI/MoC and GIZ are pleased to present to you the report on Climate Resilience in Vietnam: An Assessment in Metropolitan Regions. The paper reflects our experiences gained during long years of operating in the urban environment sector together. We trust that the readers and the participating partners of the Programme will find this report valuable to refer to in their daily work.

Taking this opportunity, ATI/MoC and GIZ would like to express our sincere thanks to ministerial and provincial leaders and officials for contributing to this paper. We greatly appreciate the support of Prof. John Soussan and the Donor Coordination Group for Urban Sanitation and Wastewater Management in Vietnam.

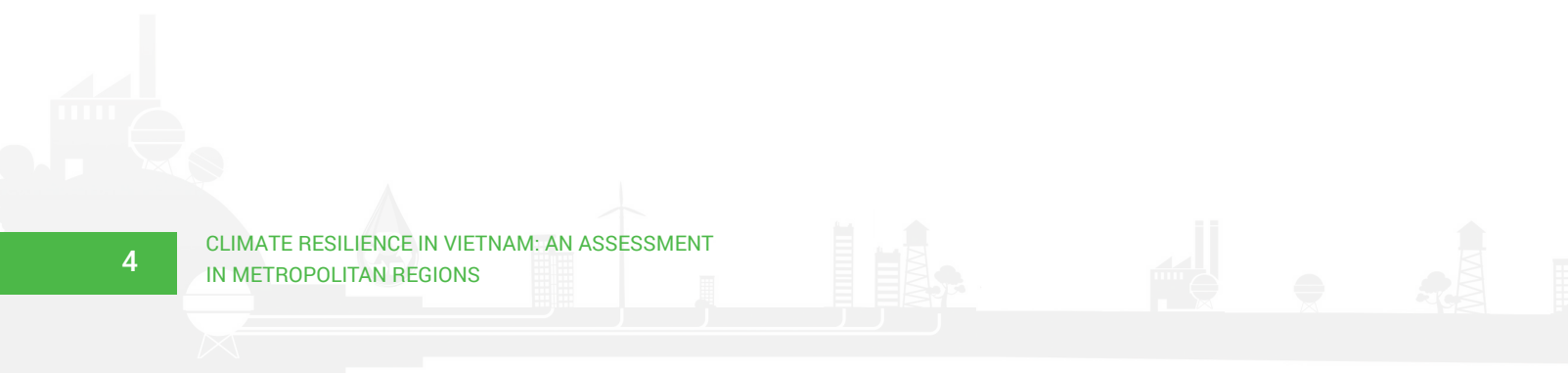
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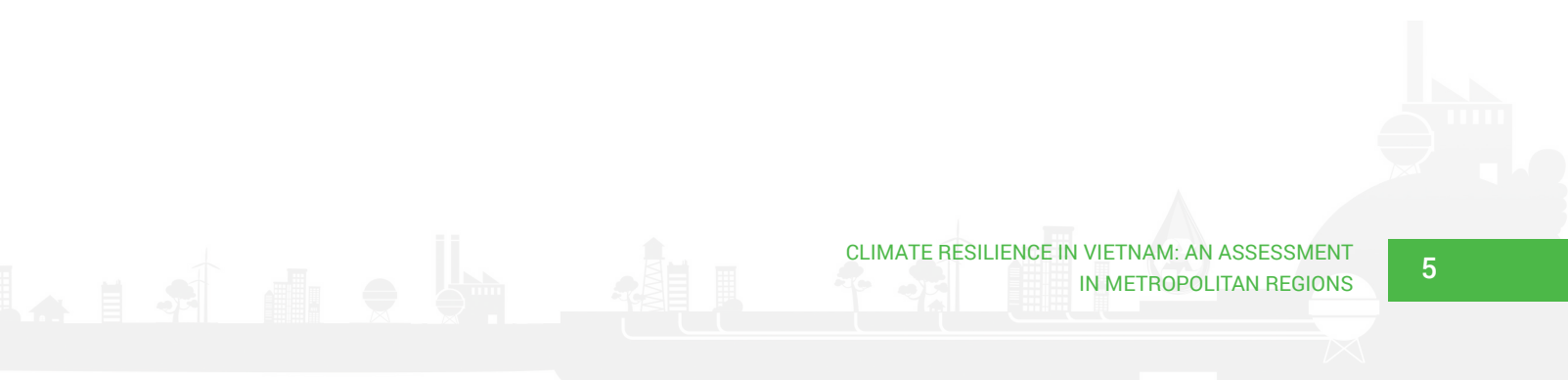
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1.1 Introduction

Vietnam is recognized as one of the world's most vulnerable countries to the risks associated with current extreme weather events and future climate change impacts. Every year sees the effects of these impacts on the people and economy of the country. The year 2017, when this report was written, saw serious loss of life and economic damage from Typhoon Doksuri, Typhoon Damrey and other events. These tolls will continue and, in all probability, get worse in coming years and decades. The World Bank¹ estimates that "About 70 percent of its population is exposed to risks, such as typhoons, floods, droughts, sea water intrusion, landslides, forest fires and occasional earthquakes". Strengthening planning and administrative system so that they can both reduce these risks and more effectively respond when floods and other disasters strike is one of the key development challenges facing Vietnam.

Mekong Urban Flood Resilience and Drainage Programme

This paper has been prepared through the Mekong Urban Flood Resilience and Drainage Programme which is implemented through the Ministry of Construction and is supported by the German and Swiss Governments. The programme responds to Vietnam's vulnerability to natural disasters and climate change impacts and seeks to strengthen national and local capacities for resilience planning and flood risk reduction. The national policy and legal framework will be improved, provincial and city planning strengthened and local people enabled to better react to flood events through improved early warning systems and flood management plans.

Vietnam's cities, and the regions surrounding them, are growing quickly, bringing many benefits but also leading to new and increased risks of exposure to natural disasters and environmental change. These developments, combined with international economic and environmental trends, have led to the emergence of new challenges that in turn need structural changes to administrative and management systems. Two of the key trends are, firstly, rapid urbanization and changes to settlement patterns and, secondly, the risks associated with climate change and the increasing frequency of natural disasters. This paper looks at the interaction

between these two processes and presents an analysis that shows that there is a need to develop greater resilience in the management of cities and their surrounding regions. The paper argues that strengthening the planning and administrative systems will need new thinking and new ways of operating, with the integration of a resilience approach into planning and management and the development of more effective levels of cooperation and coordination between different agencies, both government and private, within provinces and also between different administrative areas, especially provinces and city authorities.



¹ World Bank website (2012) World Bank and Disaster Risk Management in East Asia and the Pacific World Bank, Washington D.C.



Da Nang City

1.2 Growing Metropolitan Regions

A recent GIZ² paper argued that addressing the vulnerability of cities to climate change and disaster risks was most effectively done through working in a wider area, a Metropolitan Region, which the paper defines as follows: “Metropolitan regions span both inner core and surrounding peri-urban areas and are made up of a set of interlocking systems that encompass their physical, ecological, economic, and social functions” (page 3). The paper goes on to argue that a key element of the functioning of a Metropolitan Region is its relationship to the maintenance and provision of essential urban services: “Another way to define a metropolitan region is as an ‘infrastructure-shed,’ since water, energy, transportation, and waste systems of cities often extend well beyond the boundaries of the central municipality”.

As such, the concept of a Metropolitan Region includes both a geographical element, a city and surrounding areas with which it is closely connected (in some cases demarked by a group of administrative areas such as districts or provinces), and a functional element, the area within which certain specified services or other functions take place. This in turn can relate to ecological units such as a river basin (or part of a basin) or particular biomes which have a functional relationship to the city. Metropolitan Regions can also be defined in relation to the interactions between key groups of stakeholders through which certain functions operate. The GIZ paper discussed above identifies five principal groups of stakeholders that should be involved in actions related to strengthening the ability to cope with and respond to natural disasters (discussed more fully below): **(i)** *the administrative entities of the state, including the lead city, and surrounding municipal and province/district authorities, and the relevant ministries of the national government;* **(ii)** *citizen and community groups;* **(iii)** *infrastructure managers for key urban services;* **(iv)** *the private sector, including both service providers and enterprises likely to be affected by any hazards such as floods and storms;* and **(v)** *knowledge providers who are able to ensure decision makers have relevant information at the right time to anticipate and respond to risks and development opportunities in the Metropolitan Region.*

Within Vietnam, Metropolitan Regions are not a recognized entity in the normal policy and institutional structure (discussed in more detail below) but there have been two functional Metropolitan Regions defined in relation to Hanoi and Ho Chi Minh City (HCMC), shown in Figure 1. The Hanoi Capital Region was established by decision 490/QD-TTg dated May 5, 2008 to include Hanoi city and, originally, 7 provinces, which became six following the decision by the national assembly to incorporate Ha Tay province as part of Hanoi City. The Capital Region has a total area of 13,436 km², many times the size of the administrative area of Hanoi itself. It is defined based on administrative areas (provinces) and does not have any region-level administrative functions; the Capital Region is defined to provide coordination across the separate city and provincial administrations in the area.

Similarly, according to Decision No.2076/QD-TTg dated 22 December, 2017 approving the Planning on Construction of Ho Chi Minh Metropolitan Region up to 2030 with a Vision towards 2050, this Region consists of HCMC, the provinces surrounding the city and two additional provinces in the Mekong Delta for a total of seven provinces. It is a large area of 30,404 km², with radius of 150–200 km and a population of over 25 million inhabitants. It includes important functional areas that are closely linked to but not part of the administrative area of HCMC including the main port, Long Thanh and Tan Son Nhat international airports, a number of large industrial areas and several resort and recreation areas. The approach is once again for the Metropolitan Region to function through the coordination of different administrative areas over particular functions rather than having a new overarching administrative level. The creation of these two Metropolitan Regions, based on coordination of existing administrative areas, represents a recognition in Vietnam of the importance of and need for coordination on certain functions within areas that relate to the functioning of major cities but that stretch over much larger areas. This is in turn a recognition that the scale and pace of urbanization requires new approaches to the administration and coordination of key functions and services.

²Rosenzweig, C., Bader, D. & Ali, S. (2014) Enhancing Climate Resilience in Metropolitan Regions GTIZ Discussion Paper, GIZ Bonn

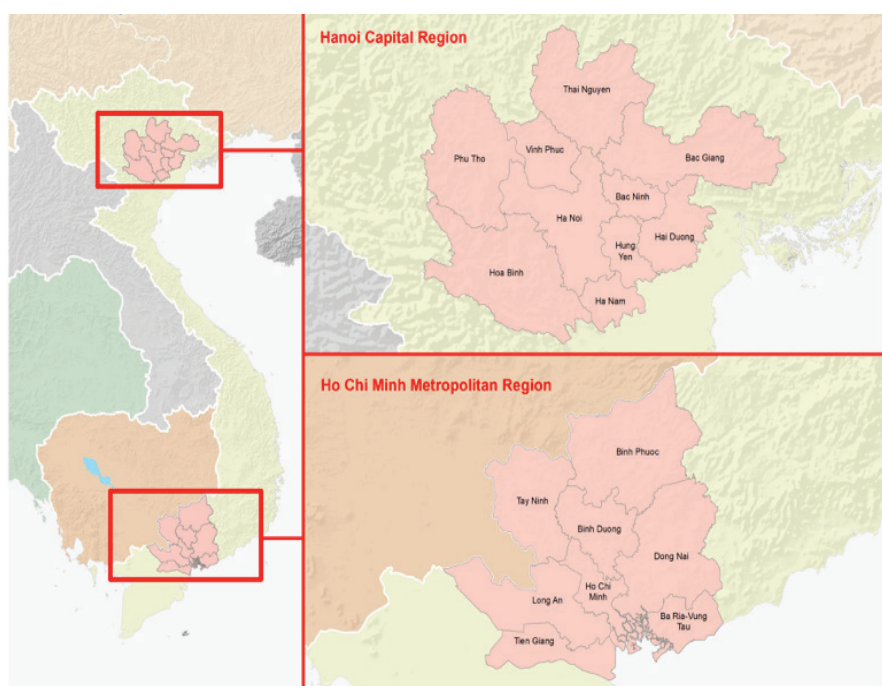


Figure 1: Metropolitan Regions in Vietnam

Vietnam's rate of urbanization, in recent years increasing at 2.8% annually (compared to a national population growth rate just above 1%), has been the highest in the ASEAN region³ in the last two decades since the Doi Moi reforms were introduced, with the proportion of the population living in urban areas increasing from 20% in 1998 to 24% in 2006 and 36.6% in 2016 when the total area of land covered by urban areas, some 41,700 square kilometres, represented 12.6% of Vietnam's total area⁴. In total urban population terms, an estimated 33.1 million people lived in cities in 2017 (out of a total population estimated to be 95.6 million), an increase from 27 million in 2010, 19.7 million in 2000 and 13.95 million in 1990. In other words, the number of people living in Vietnam's cities has more than doubled in the past 25 years⁵.

The importance of cities in national development in Vietnam, as in other countries, is hard to over-estimate: as the SECO Country Strategy⁶ notes "Vietnam's urban areas account for two-thirds of the national GDP and the average rate of annual economic growth is up to two times higher than the country's average". The same document goes on to note the importance of ensuring that urbanization follows a sustainable and

climate-resilient pathway which, in turn, requires "sound urban planning and development" and pro-active action to address weak coordination and ensure sound infrastructure investments and service provision.

The two largest cities, Hanoi and Ho Chi Minh City, represent a large proportion of the urban population and are both growing quickly but many smaller cities are also growing as quickly or more rapidly; for example, the growth of Can Tho in the Mekong Delta between 2010 and 2015, at 46% over the period, was significantly greater than either of the two largest cities and the overall national rate of 23% over the same period.

The driving force behind this growth is rural to urban migration, with over 1 million people moving to cities each year; a trend that shows no sign of abating. It is expected that 50% of the population will be urban by 2025 and 60% by 2050. These growing cities are the engine of economic development, contributing over 50% of GDP at present, a figure that will increase in the future. Unemployment rates are lower (estimated to be 4.6% in Hanoi and HCMC in 2016), incomes are higher and access to services is much better. Urban growth is an essential part of Vietnam's economic development, which has seen per capita growth of GDP averaging 6.4% since the year 2000 and a reduction in extreme poverty from a situation in 1993 where over half the population survived on less than \$1.90 a day to one where, today, only 3% of the population live in this extreme poverty. In 2014 an estimated 13.5% of the population were defined as living in poverty by the national poverty definition and an estimated 40 million people had been raised out of poverty in the preceding two decades. Many of the remaining poor live in remote rural areas, especially in the Central and Northern Highlands. In Vietnam, as in most countries, people move to cities because their economic prospects and access to essential services is much better than in the rural areas from which they move.

³Thanh Tien News 13th July 2016

⁴Voice of Vietnam website Vietnam urbanization seeks sustainable growth 11th January 2017.

⁵Worldometers website 21st September 2017.

⁶SECO (2017) Swiss Economic Cooperation and Development Vietnam 2017-2020 Bern Switzerland

⁷ASEAN website 20th September 2017

⁸World Bank website The World Bank in Vietnam Overview 13th April 2017

1.3 Climate Change and Natural Disasters in Vietnam

Floods, major storms and other water-related disasters have been part of life in Vietnam since people first settled there and, in many areas, livelihoods and resource management systems have learnt to cope with these almost annual events. Indeed, there are numerous examples of where regular inundation can bring benefits to rural livelihoods in the shape of improved soil fertility, soil water and aquifer recharging, the harvesting of fish and other aquatic species and other benefits. This is particularly the case when the timing and intensity of the floods have been fairly predictable, meaning that livelihood systems have adjusted to take advantage of these potential benefits whilst minimizing the risks that floods can bring.

This is particularly the case when the inundations are relatively slow onset and are reasonably predictable in relation to planting and harvesting seasons. Hazards that are too intense, come at the wrong time or occur in places where the landscape is less easy to manage in relation to these phenomena have always brought risks to lives and livelihoods through intense storms, flash floods, land and soil erosion, landslides, loss of or damage to infrastructure, livestock or buildings and other negative impacts. Managing floods and storms has consequently always been a balance between seeking to take advantage of potential benefits whilst at the same time having the ability to reduce and recovery from negative impacts.

Vietnam is one of the world's most vulnerable countries to the impacts of extreme weather events⁹, ranked as the eighth most vulnerable to extreme weather events between 1996 and 2015 and fourth in terms of the proportion of the population exposed to river flood risk worldwide. An average of 430 people a year were killed by natural disasters between 2007 and 2011, with economic losses estimated at 1 percent of GDP in the same period¹⁰. This is not a new phenomenon: the annual average losses for the period 2005-2010 was 460 deaths, 908 people injured, 32,689 houses destroyed and 88,659 houses damaged with an estimated annual economic loss of close to \$1 billion¹¹. Between 1989 and 2016 floods and storms killed nearly 15,000 people and injured nearly 17,000. Damage to homes, infrastructure and economic activities is equally devastating.

The form that storms, flooding and other climate-related hazards takes varies in different parts of the countries. As has been noted, people living in low-lying riverine areas such as deltas and coastal floodplains are used to the annual flood season as a normal part of life and have adjusted their production systems to take account of it. By far the largest of these areas is the Mekong

Delta, discussed in more detail below, but they also include the Red River Delta and many other smaller areas throughout the country. These livelihood strategies are increasingly being strained, however, by changes to the timing and intensity of the floods that, along with other changes such as the loss of mangroves that increases vulnerability to storm impacts and saline intrusion related to sea level rise and the over-extraction of groundwater.

Many highland areas in Central and North Vietnam are vulnerable to flash floods

Flooding after heavy rain in Hanoi



⁹Luu, C. et al (2017) Analyzing flood fatalities in Vietnam using national disaster database and tree-based methods Natural Hazards and Earth Systems Science Discussions, Journal of Natural Hazards and Earth Systems Sciences 12 May 2017.

¹⁰Reuters 8th September 2012, quoting Prime Minister Nguyen Tan Dung's presentation at a conference on food security and climate change in Hanoi.

¹¹www.preventionweb.net (2017) Vietnam Disaster and Risk Profile

and landslides which do not involve anything like the quantities of water or geographical area associated with riverine floods but which can be devastating in areas they affect because of the very rapid and intense onset of the incident. When they happen whole communities can be devastated. For example, flash floods in the Central Highlands killed more than 730 people in 1999, 58 people were killed by flash floods in Binh Dinh and Quang Nai provinces in 2003 and 38 people were killed or missing and many houses and roads were damaged in the Northern Highlands after flash floods and landslides in July 2009. There have been a number of similar events in recent years, with flash floods in the Northern Highlands killing at least 27 people and causing widespread damage to houses and infrastructure in August 2017, with this following similar events in 2016, 2015 and most years before that.



The upland flash floods are often, but not always, triggered by major storms, with Vietnam hit by several cyclones in most years. A total of 295 major storms (level 6 to 12) hit Vietnam in the period 1961 to 2014¹². Their frequency has increased, with an average of five storms hitting Vietnam in the period 1961 to 1999 but the total rising to seven a year since 2000. These cyclones pose different but equally severe risks to coastal areas. The long coastline and location of Vietnam makes it one of the countries most vulnerable to tropical storm impacts. Typhoon Doksuri hit central provinces in September 2017, with 80,000 people evacuated in coastal areas in anticipation of one of the most powerful cyclones to hit in recent years. It causes widespread flooding and substantial damage to houses, infrastructure and businesses. In October 2016 Typhoon Sarika caused heavy rains in central Vietnam that left 35 people dead, over 1,000 houses destroyed and a further 131,000 damaged across four provinces. Further storms hit in the weeks following and it is estimated that approximately 650,000 people in five provinces were affected by extreme weather events in the months of October and November 2016.

In 2004 Reuters reported that *“Floods and landslides have killed at least 40 people in Vietnam and 42 are missing...The floods, sparked by torrential rains from Typhoon Muifa last week, have submerged 170,000 houses in five provinces and destroyed roads, cutting food relief to many areas. Thousands of people have fled their homes and an official said 270,000 people in just one of the affected provinces needed urgent help.”*¹³ Similar storms hit coastal areas of Vietnam almost every year, with the central coastal provinces particularly vulnerable to storm damage and flooding.

These extreme events cause severe economic disruption every year in coastal areas and many years also see substantial loss of life. Whilst they have always been a feature of life, it does appear that climate change is causing them to be more frequent and more intense. At the same time, changes to coastal areas such as the loss of mangroves (which provide protection from storm surges) and construction in exposed locations result in these storms causing more damage than has occurred in the past.

The Mekong Delta (figure 2) is an area that both depends on the positive benefits of the annual river floods and suffers acutely from the negative impacts of changes to the characteristics of the area’s hydrological regime. It is important to take account of the positive benefits but also to reflect the frequent incidence of loss of life and substantial economic damage. A few examples from recent years reflect this. In 1996, flooding in the Mekong Delta killed 180 people, submerged or damaged nearly 800,000 houses, and tens of thousands of people were given emergency relief. In September 2000, 480 people were killed in floods as waters in the Mekong Delta near Cambodia rose to historically high levels. In 2001, 390 people, mostly children, were killed in floods in the Mekong Delta region in the south. In 2002 around 170 people, the majority of them children, died during severe flooding in the Mekong Delta area. In October 2005, AFP reported: *“Fifty-seven people have perished in floods ravaging the Mekong delta in southern Vietnam and in the central region over the last several weeks”*.

¹²Luu, C. et al (2017) Analyzing flood fatalities in Vietnam using national disaster database and tree-based methods Natural Hazards and ¹³Earth Systems Science Discussions, Journal of Natural Hazards and Earth Systems Sciences 12 May 2017.

¹³Reuters report 29th November 2004

A number of factors are combining to cause substantial and, in all likelihood, irreversible changes to key aspects of the Mekong Delta's hydrological dynamics:

- The evidence available suggests that the quantity of water entering Vietnam in the Mekong River is falling in both wet and dry seasons, with the construction of dams and increased extractions in the upstream river basin likely to be at least a substantial part of the cause of this.
- Sea level rise is exposing larger areas to coastal flooding and saline intrusion and the penetration inland of brackish water increases every year. It is also resulting in increasing salinity in a number of groundwater aquifers, especially in coastal areas.
- Land subsidence, caused in part at least by the over-abstraction of groundwater throughout the delta, is making many areas that were previously safe from all but the most extreme floods much more vulnerable, especially to tidal flooding when the effects of subsidence are combined with sea level rises.
- The loss of mangroves and land-use changes noted above in central Vietnam are also happening in the Mekong Delta, meaning many areas are more vulnerable to coastal flooding and more people and infrastructure is located in vulnerable places.

As figure 3 shows, the last 15 years or so have seen a decline in the levels of the annual riverine floods caused by waters coming down the Mekong River from upstream areas in the basin. This is reducing hazards from excessive river floods in the delta area closest to the Cambodian border but is also precipitating the loss of flood benefits in many areas and being a factor in the increased penetration of tidal floods and saline groundwater (see below). The potential negative economic impacts, identified in the figure, could affect both the whole Mekong Delta region and the national economy as a whole.

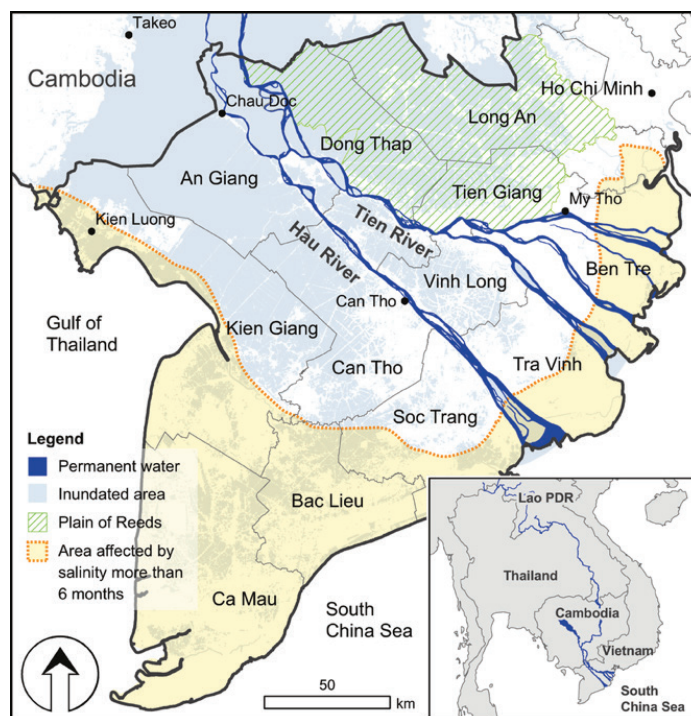


Figure 2: The Mekong Delta¹⁴

Land subsidence is a major and increasing problem in the Mekong Delta, most of which is only 1-2 meters above sea level. A recent study showed that many areas are sinking at a rate of between 1-3 cm per year and a large part of the delta has sunk between 25-35 cm in the past 25 years¹⁵ The paper argues that groundwater extraction is a major cause of this subsidence, with most parts of the delta having a rapidly falling water table as excessive amounts of water are pumped out for agriculture, industry, domestic use, desalting land and other purposes.

The impact of land subsidence combined with sea level rises (see figure 4) which are predicted to occur at a rate of 9 mm a year in the Mekong Delta area. These rises would be of some significance on their own but, when combined with land subsidence, changed river flows, changes to coastal land cover and increased development in exposed locations, means that the risks of saline intrusion, tidal flooding and storm surge impacts are all significantly increased to change the disaster risk profile of the Mekong Delta.

¹⁴Source: Kakonen, M. (2008) Mekong Delta at the crossroads: more control or adaptation? *Ambio* vol 37 no 3, pages 205-211, June 2008

¹⁵Utrecht University website (2017) article from the Urbanizing Deltas of the World programme dated 1st June 2017.

Saline intrusion is an increasing problem. As figure 6¹⁶ shows, it now affects a large part of the delta with a wide coastal band now faced with salinity problems throughout the year and an increasingly wide area facing problems on a seasonal basis. This affects both surface and groundwater and is an increasing challenge for agriculture, for domestic water supplies, for the integrity of many deltaic ecosystems and for other aspects of water resources use.

The changes to the seasonal climate dynamics and river flows from upstream in the Mekong are not just affecting the flood regimes. Reduced dry season flows are also resulting in increasing drought risks, with a particularly severe drought in 2016 following low rainfall and river flows in 2014 and 2015¹⁷. The water shortages were combined with saline intrusion so that salt is now found in fields in an increasing number of Mekong Delta provinces. This had a severe impact upon

agricultural production in a number of areas in the Mekong Delta, with the production of rice, fruits and other essential dry season crops affected, and also affected the drinking water supply of 575,000 people including critical services such as hospitals and schools. The Department of Crop Protection estimated that the economic cost of the drought would be \$1.5 billion.

Changing climate and hydrological conditions in the Mekong Delta are consequently a complex interaction of a number of factors that are likely to have widespread and unpredictable impacts on many aspects of the development of the area. Figure 6¹⁸ summarizes this range of potential impacts into three categories: **(i) increased poverty; (ii) reduced sustainability of natural resource productivity and the environment; and (iii) adverse effects on social and institutional stability.** *The likelihood of these risks actually happening, along with their severity, will of course vary from place to place and will be contingent upon the actions taken to anticipate and mitigate them, but they do illustrate the extent to which changing climate conditions are likely to affect the Mekong Delta and other parts of Vietnam.*

The incidence of climate-related hazards in Vietnam varies greatly and takes different forms in different parts of the country. The natural characteristics of a large, low-lying deltaic area means that it is both opportunity and problem in the Mekong Delta but the dynamic interactions in recent years between changing river flows, over-abstraction of groundwater, sea level rises, changing patterns of land use and climate change mean that there are real concerns that the benefits are likely to decline and the problems increase in this vital economic area of Vietnam. Addressing these challenges will need concerted actions across the delta and in a wider area.

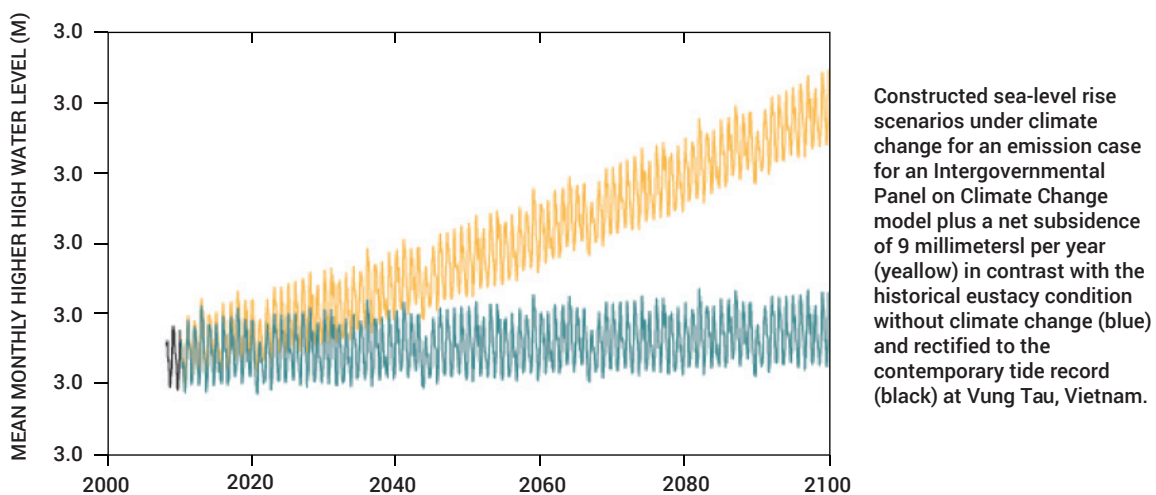


Figure 3: Predicted Sea Level Rises in the Mekong Delta

¹⁶Akira Yamishita (2017) Flood in the Mekong Delta Can Tho University, Department of Environmental Management and Natural Resources

¹⁷Tatarski, M. (2016) Mekong Delta drought wreaking economic havoc AECNews.com March 28th 2016

¹⁸Ribbe, L. et al (2013) Comparison of key drivers regarding their significance for hydro-meteorological extremes and their impacts on selected hotspots in the Mekong River Basin GIZ, Bonn

As has been said, the driving force behind these increased hydrological hazards is climate change, though other factors such as changing land-use patterns and over-abstraction of groundwater will exacerbate the likely climate change impacts. A detailed analysis of different climate change scenarios¹⁹ by MoNRE shows that different patterns of change will be found in different parts of the country but all regions will experience major climate change impacts. Temperature increases will be found throughout the country (Figure 7) but the intensity of these increases will vary somewhat. Rainfall patterns are likely to show greater variability, with all regions showing total rainfall increasing but the south and south-central parts of the country likely to have lower dry season rainfall. Extreme events will increase and be more intensive throughout the country.

Vietnam has been identified as one of the world's most vulnerable countries to the impact of climate change: "Given that a high proportion of the country's population and economic assets (including irrigated agriculture) are located in coastal lowlands and deltas, Vietnam has been ranked among the five countries likely to be most affected by climate change"²⁰. The evidence available suggests that climate change impacts can already be felt. The USAID²¹ cites several trends observable since 1960, including a + 0.5°C increase in mean annual temperatures, a significant increase in the number of 'hot' days a year decreased annual rainfall totals in the north and increased totals in the south, rising sea level of 0.39 cm/year at Vung Tau station, an overall increase in the frequency and intensity of typhoons and a southward shift in the typhoon track. The same USAID report suggests that projections indicate that Vietnam will experience the following climate change impacts:

- Increases in annual mean temperatures of 1°–2°C by 2050.
- By 2050 a 180 percent increase in the number of heat waves.
- Increases in annual rainfall across all regions by 2–7 percent, with more extreme precipitation variability between the dry and rainy season by 2050.
- By 2090, increases of 2–14 percent in the proportion of total rainfall falling during heavy events, particularly in northern regions, with increased risk of landslides in mountain areas.
- Rising sea levels of 28–33 cm by 2050.

FLOODS IN MEKONG DELTA REGION BECOME FEWER

More than 80 percent of water sources in the Mekong Delta region are supplied by the Mekong River. In the flood season of 2016, the region is facing possible early drought and saltwater intrusion due to the exhaustion of conserved water.

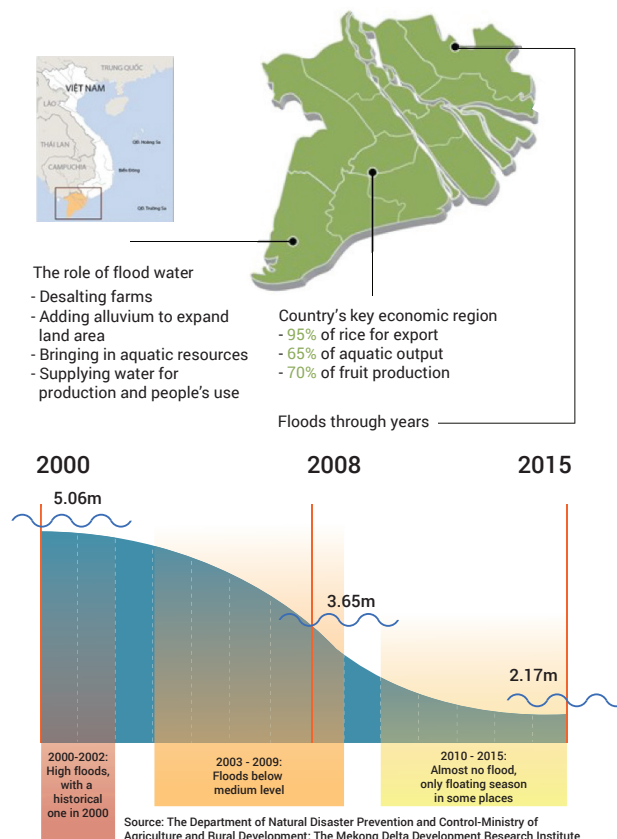


Figure 4: Riverine Floods in the Mekong Delta

¹⁹MoNRE (2016) Climate Change and Sea Level Scenarios for Vietnam Ministry of Environment and Natural Resources, Government of Vietnam, Hanoi

²⁰World Bank (2011) Vietnam Climate Risk and Adaptation Country Profile World Bank, Washington D.C. page 1

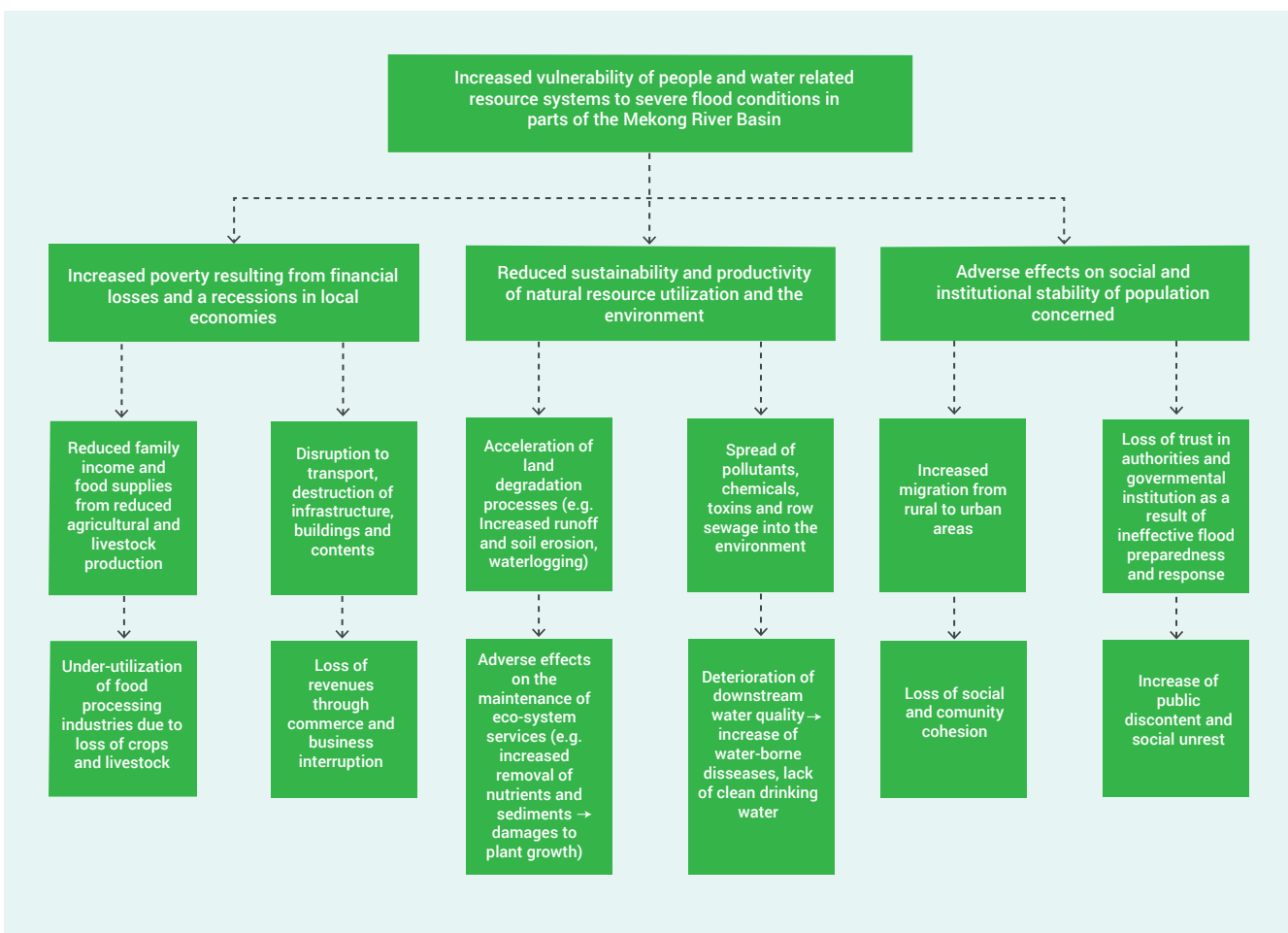
²¹USAID (2017) Climate Change Risk Profile Fact Sheet: Vietnam USAID, Washington D.C.

These trends and predictions are echoed in numerous other authoritative reports. For example, a joint MoNRE/UNDP report²², in collaboration with several other agencies, identified a range of existing and possible future climate change impacts similar to those cited in the USAID report and went on to state that a wide range of negative effects on the people, environment and economy of Vietnam. This included significant increased risks of hydrologically-related disasters such as landslides, flash floods and major storm surges. Salinization would be likely to increase significantly, especially in the Mekong Delta but also potentially in other parts of the country and economic sectors closely tied to hydrological and climate patterns such as agriculture, forestry and tourism are likely to be seriously affected unless concerted remedial actions are taken.

Infrastructure such as roads, irrigation, water supply systems, hydropower and other facilities are also likely to be seriously affected by climate change, further exacerbating potential social

and economic impacts on Vietnam. For example, it is estimated that the additional cost of maintaining the road network will be \$10.5 billion through to 2050²³. The reliability and operational costs of irrigation and hydropower schemes are likely to be impacted, with in particular concerns over the effects of changes to dry season rainfall and water availability. As well as substantial agricultural impacts, climate change is likely to affect aquaculture (including shrimp production), a rapidly growing sector that makes up 3 percent of Vietnam’s GDP and 12.5 percent of total exports²⁴. These effects will be particularly acute in deltas and coastal areas but will be felt throughout the country.

Figure 5: Potential Effects of Increased Flood Related Vulnerability in the Mekong Basin



²²UNDP et al (2015) Vietnam Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation UNDP, Hanoi

²³Chinowsky, P. et al (2015) Road Infrastructure and Climate Change in Vietnam Sustainability 2015, 7, 5452-5470

²⁴World Bank (2011) Vietnam Climate Risk and Adaptation Country Profile World Bank, Washington D.C. page 1

The Director of the Climate Change Adaptation Division on MoNRE has recently suggested that these and other impacts will result in 5 percent of Vietnam's land being lost, with 11 percent of the population affected, 7 percent of agriculture impacted and a 10 percent decline in GDP, with many of the impacts disproportionately affecting the poor and most vulnerable segments of society²⁵ The need for a concerted response to the risks associated with climate change has been recognized by the Government of Vietnam for some time and is reflected in the National strategy on climate change was issued by Prime Minister Nguyen Tan Dung in Decision 2139/QĐ-TTg on December 05, 2011. The strategy states



Flooding in Ho Chi Minh City

that: "According to climate change scenarios, in late 21st century, Viet Nam's yearly mean temperature will go up by 2-3°C, the total yearly and seasonal rainfall increases while the rainfall in dry seasons will decrease, the sea level can rise by 75 cm to 1 m compared to the 1980-1999 period". The strategy advances a number of targets and activities intended to ensure that climate change adaptation and mitigation measures are integrated into all aspects of national development.

The effects of climate change is consequently a key issue in any discussion on strategies to address Vietnam's existing severe challenges in disaster risk management and urbanization. The range of challenges discussed above will in most cases become more severe and future risks are more unpredictable. Any sustainable responses to disaster risks must take account of the future amplification of risks and uncertainties that results from climate change.

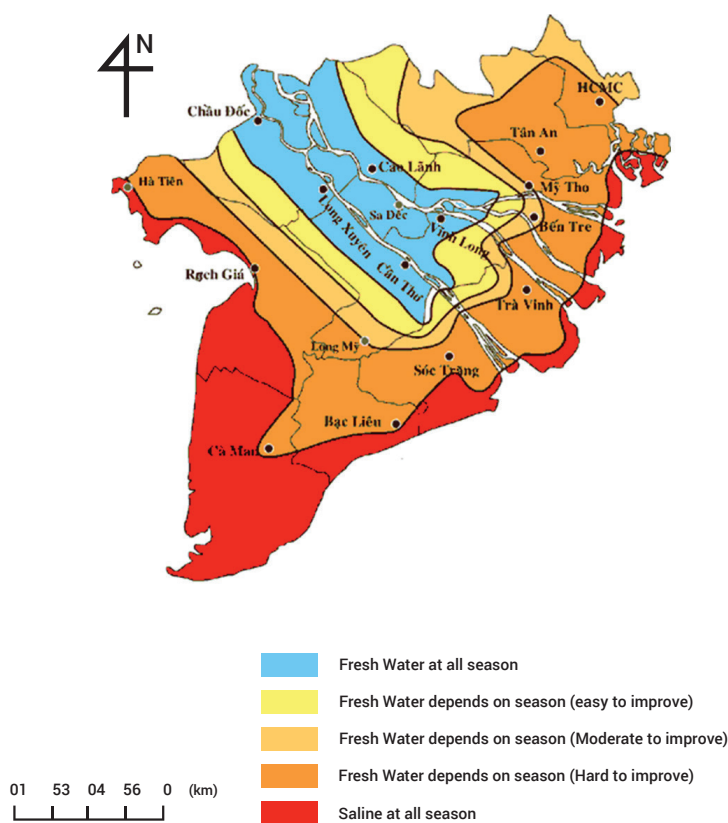


Figure 6: Saline Intrusion in the Mekong Delta

²⁵Le Minh Nhat (2017) Climate Change Impacts and Adaptation Efforts in Vietnam powerpoint presentation, Department of Meteorology, Hydrology and Climate Change, Ministry of Environment and Natural Resources, Government of Vietnam, Hanoi

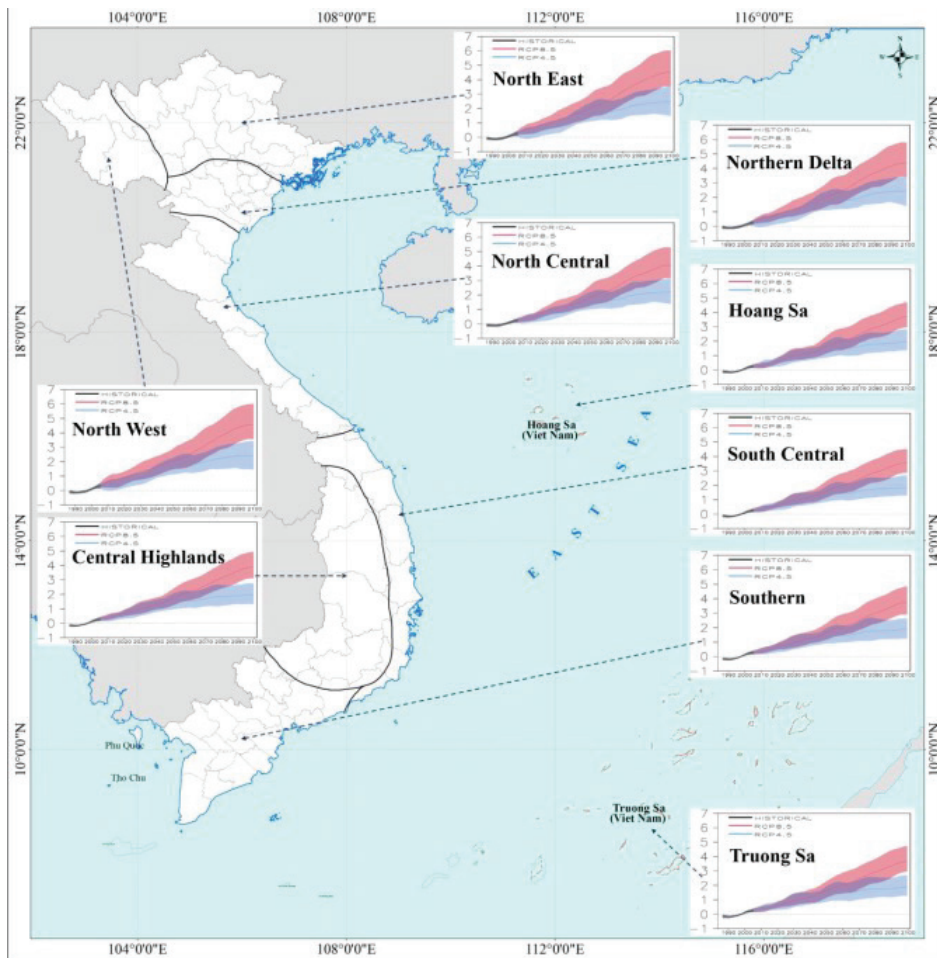


Figure 7: Predicted Temperature Increases in Different Regions of Vietnam



Can Tho City

1.4 Urban Resilience

One of the central ideas to emerge on how to address the challenges Metropolitan Regions face in addressing the risks associated with climate change and disaster risk management is resilience. It is a concept that has many meanings and is used in different settings but central to the concept is that the systems in question develop an enhanced capacity to deal with and recover from both short-term shocks (such as major storms and floods) and long-term trends, especially those associated with climate change. A recent report²⁶ defined urban resilience as “the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience”.

GIZ²⁷ give a similar definition for resilience in Metropolitan Regions: “The ability of a metropolitan region and its component systems to anticipate, absorb, accommodate,

Disaster Preparedness in Hat Yai, Thailand

Hat Yai in Songkhla Province, Southern Thailand, has experienced persistent seasonal floods nearly every year. Following the disastrous floods of 2001, the local government installed water monitoring technologies to provide early warning of flood risks and help manage the drainage system. This was combined with activities to inform local communities of flood risks and prepare for a flood response when they happen.

Asian Cities Climate Change Resilience Network (2016) Achievements in Building Capacities, Changing Practices and Strengthening Networks ISET, Boulder, Colorado, USA

or recover from the effects of a potentially hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions” (page 3). The nature of urban resilience is further characterized by ACCRN²⁸ : “Resilient systems rely on a variety of factors including flexibility, redundancy, resourcefulness, safe failure,

responsiveness, and learning, among others, to ensure the provision of essential services to urban residents in the face of disruption”.

Meerow et al (2016)²⁹ review a number of definitions of urban resilience and propose a new one that integrates the key features of earlier definitions: “Urban resilience refers to the ability of an urban system - and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales - to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.”

Three key features of resilience³⁰ are:

(i) persistence, the ability to survive, continue to function and endure even when severely disrupted (for example from a severe flood or storm);

(ii) adaptability, the ability to continue to operate in a wide range of circumstances, including the ability to change the nature of the operations to reflect changing conditions;

(iii) transformability, the ability to change to a new state that reflects long-term change to the conditions in which the system operates, for example new patterns of rainfall and water resources availability that are a consequence of climate change. Developing resilience in Metropolitan Regions entails conscious strategies to enhance these different features of resilience in ways that are appropriate to local needs and conditions.

These quotations can seem complex and obscure, but some key features of these and other definitions give an understanding of the essential features of a resilience approach to the management of climate-related (and other) risks in Metropolitan Regions:

- Resilience is the ability to cope with and recover from climate events that cannot be fully predicted. This includes both short-term shocks and long-term trends.
- ‘Recover’ does not necessarily mean returning to the pre-existing conditions. Resilience recognizes

²⁶100 Resilient Cities (2017) 100RC: Catalysing the Urban Resilience Market 100 Resilient Cities Program

²⁷Rosenzweig, C., Bader, D. & Ali, S. (2014) Enhancing Climate Resilience in Metropolitan Regions GTIZ Discussion Paper, GIZ Bonn

²⁸ACCRN (2012) ACCRN Cities Project 34, quoted in Rosenzweig et al (2014) *ibid*.

²⁹Meerow, S. et al (2016) Defining Urban Resilience: a Review Landscape & Urban Planning vol 147, pages 38 – 49

³⁰Walker, B., Holling, C. S., Carpenter, S. R. & Kinzig, A. Resilience, adaptability and transformability in social-ecological systems. *Ecology and society* 9, 5 (2004).

that cities and their surrounding regions are inherently dynamic, changing and developing as people move in and the economy develops. Part of resilience is the ability to keep on a positive development trajectory despite the impacts of unpredictable and adverse shocks and trends.

- A key feature of resilience is the interactions between socio-economic systems and climatic/environmental systems and building resilience involves actions in both spheres, such as improving the management of water resources within a Metropolitan Region and taking actions to ensure urban services such as electricity and transport are not severely disrupted by extreme events.
- Given the uncertainty associated with many risks, a key feature of strengthening resilience is ensuring greater flexibility and responsiveness in urban management and service provision systems. The ability to adapt is fundamentally the ability to respond to the unknown.
- Strengthening resilience is not the work of one agency or section of society alone. The GIZ report cited earlier states that the key players in metropolitan resilience include: **(i)** the state: Lead City, Metropolitan Region Municipal, State, and National Governments; **(ii)** citizens groups; **(iii)** infrastructure and utility managers; **(iv)** the private sector; and **(v)** knowledge providers.
- Similarly, strengthening resilience involves actions in a range of areas: GIZ suggests that this includes dynamic interactions between engineering

approaches, ecosystems approaches, social approaches, governance and policy approaches, funding and urban adaptation initiatives.

UN Habitat³¹ discusses the implications of strengthening urban resilience for one key actor: national policy makers, arguing that climate change adaptation and disaster risk reduction should be integrated into the overall urban development and governance policy framework of the national government. This is seen as an essential step to create an enabling environment for actions by local governments and other stakeholders, including ensuring an appropriate regulatory context for innovative financing mechanisms at the municipal level. The report sets out 16 recommendations for advancing resilience in urban policies, grouped in three clusters:

- (i)** Promoting Low-Carbon Urban Development;
 - (ii)** Building Climate Resilience;
 - and (iii)** Addressing Urban Climate Governance.
- In a separate report³² Habitat defines the goal of national urban policy as being to provide "A coherent set of decisions derived through a deliberate government-led process of coordinating and rallying various actors for a common vision and goal that will promote more transformative, productive, inclusive and resilient urban development for the long term"

Water Conservation and Control in Hong Kong

Hong Kong is vulnerable to a range of water resource stresses but has, through a concerted programme, set an international standard for improved water efficiency, conservation and savings. Severe water shortages in the 1960s led to legislation requiring all new constructions to use sea water for seawater flushing, with the government providing funds for the construction of parallel plumbing networks. By 1999 79% of residences in Hong Kong used seawater for flushing, resulting in huge savings of potable water. In 2012 the city was using nearly 750,000 cubic meters of water a day for flushing. In addition the city has constructed a desalination plant and has greywater recycling programmes. These actions have greatly reduced the city's vulnerability to water resource risks.

Rosenzweig, C., Bader, D. & Ali, S. (2014) Enhancing Climate Resilience in Metropolitan Regions GIZ Discussion Paper, GIZ Bonn

³¹UN Habitat (2016) Addressing Climate Change in National Urban Policy Cities and Climate Change Initiative, Policy Note no. 4, UN Habitat, Nairobi

³²UN-Habitat, 2015, National Urban Policy: A guiding framework. Nairobi

The 2016 Habitat report also relates the national policy framework to international development agreements, including the 2015 Paris Climate Change agreement and the UN's 2030 Agenda for Sustainable Development Goal 11: to Make cities and human settlements inclusive, safe, resilient and sustainable. This reflects the October 2016 Habitat New Urban Agenda from the Habitat II Conference in Quito, which included the key principle to adopt and implement disaster risk reduction and management, reduce vulnerability, build resilience and responsiveness to natural and human-made hazards, and foster mitigation of and adaptation to climate change.

Strengthening Local Resilience to Reduce Risks and Improve Conditions

In Quelimane City in Mozambique, local community groups were supported by the city council and NGOs to reduce flood risks and improve preparedness through a combination of actions that included clearing drainage canals, widening and improving roadways, installing water points, constructing rainwater collection systems and improving sanitation. This was combined with awareness activities and the strengthening of the organizational system to maintain local infrastructure and respond to flood risks. The initiative was based on community groups but had strong support from the city's government.

Jha, A. & Brecht, H. (2013) Building Urban Resilience in Asia World Bank,

The concept of resilient cities is recognized in the Draft Law on Urban Development (Draft of 24th November 2017) that is, at the time of writing, being prepared by the Ministry of Construction in Vietnam. The law contains a number of specific reference to resilient cities and links the approach to wider policies on climate change, green growth and smart cities. Article 20, on the main principles for urban resilient cities, states that a resilient city approach must be integrated into all urban development and socio-economic development plans and strategies and must be given technical and human resources for its implementation. Particular emphasis is placed on the relevance of the approach in provinces

vulnerable to natural disasters. Article 21 is concerned with the "encouragement and incentive mechanism for resilient cities to adapt to climate change, green growth and smart cities". It sets the provision of financial support for resilient city investments as a priority for national target programmes and identifies a number of financial and other incentive mechanisms including tax benefits, access to land and access to low interest loans from development banks and other sources. Overall, the draft law places an emphasis on the role of government, at all levels, to encourage and create conditions and incentives to support resilient city development.

At the local government level, the World Bank³³ argues that all cities will need to address the links between sustainable urbanization, climate change impacts and disaster risk reduction within their own development policy framework, with the decentralization trends found in much of Asia reinforcing the need to make sure this happens. An essential first step for this is the need for local governments to understand the concepts and consequences of climate change and the links between this and the incidence and severity of natural disasters. The coastal location and high population density of many cities makes them vulnerable to these threats but, conversely, the relative strength of the urban economy and society means that they are well placed to address them if a coherent institutional framework is created to do so.

In an additional report³⁴, the World Bank provides what is described as practical guidance on the implementation of investments to strengthen resilience in three key sectors: water management & wastewater systems including flooding, energy and communications and, finally, transport. It argues that, rather than focusing on optimal engineering design, urban infrastructure development should adopt approaches that structure in uncertainties and unknown risks and that balance ecosystem, engineering and land use management options.

³³Prasad, N. et al (2009) Climate Resilient Cities World Bank, Washington D.C.

³⁴Jha, A. & Brecht, H. (2013) Building Urban Resilience in Asia World Bank, Washington D.C.

The development of improved resilience in Metropolitan Regions can bring direct economic benefits as well as long-term risk reduction. For example, in Semarang Indonesia³⁵ the development of ecotourism in mangrove areas close to the city has become an important source of revenue for local communities. This has resulted in the replanting of 330,000 mangrove seedlings in areas of mangrove forest that had become severely degraded. These mangroves play a vital role in protecting the city from flood and storm risks as well as maintaining the integrity of the wider coastal ecosystem.

The 100 Resilient Cities programme³⁶ has argued that strengthening the resilience of Metropolitan Regions will require the active involvement of the private sector, and that this can be realized in four major areas of opportunity where productive investments could be made. Governments have a key role to play in the creation of an environment that reduces investment risks and stimulates the private sector to take advantage of these opportunities. The potential areas for investment are:

- *Water management: major area of risks & need for IWRM approaches.*
- *Big Data management: to provide information to decision makers to make choices for 'smart cities' development.*
- *Innovative financing: for actions to strengthen resilience and manage risks.*
- *Technologies for community engagement: to revolutionize the ways cities interact with and garner support from local communities.*

Climate Change Adaptation in Durban, South Africa

Durban launched the Municipal Climate Protection Programme in 2004 which sought to address climate risk within a broader development, environmental sustainability and poverty reduction approach. An assessment showed that Durban is vulnerable to a variety of future climate risks, including sea level rises, extreme weather events and increased water scarcity. The city developed a number of climate adaptation initiatives and at the same time worked to establish an overall climate protection plan and an institutional structure to bring together key stakeholders. There was some initial resistance but a phased programme of

activities gradually brought together a range of local actors to work towards a city-wide approach to climate adaptation and preparedness. This includes a municipal and a number of sectoral adaptation plans as well as community-based mobilization activities. Durban now provides an internationally-recognized example of the effectiveness of a comprehensive approach that integrates climate resilience into an overall development strategy.

Roberts, D. & O'Donoghue, S. (2013) Urban Environmental Challenges and Climate Change Action in Durban, South Africa in *Environment and Urbanization* vol 25, no 2, October 2013, pages 299 – 319

The development of a resilience-based approach to urban development should not be seen in isolation; it is closely linked to the ideas of green growth and Smart Cities, something that is enshrined in the Draft Law on Urban Development Management (DraT of 24th November 2017). The idea of Smart Cities is based on urban development that uses information and communications technologies, along with wide public awareness and participation to ensure that infrastructure and service provision in a city is more efficient, responsive to needs and change and flexible in their future development trajectories. A recent definition³⁷ reveals these characteristics: "A Smart City is an integrated system in which human and social capital interact, using technology-based solutions. It aims to efficiently achieve sustainable and resilient development and a high quality of life on the basis of a multi-stakeholder, municipality-based partnership".

The focus of this paper is on resilience in relation to water-related disasters and climate change but there are other dimensions of these issues that are also important, showing that urbanization based on resilience and smart city approaches can be the catalyst of sustainable and innovative development. One such area is energy, with in particular a focus on energy efficiency measures in building design, utility operations, transport and other areas and the development of renewable energy either integrated into building construction or through small power generation operations on lands in the

³⁵Asian Cities Climate Change Resilience Network (2016) Achievements in Building Capacities, Changing Practices and Strengthening Networks ISET, Boulder, Colorado, USA

³⁶100 Resilient Cities (2017) 100RC: Catalyzing the Urban Resilience Market 100 Resilient Cities Program

³⁷Monzon, A. (2015) Smart City Concepts and Challenges: Bases for the Assessment of Smart City Projects in M. Helfert et al. (Eds.): Smartgreens 2015 and Vehits 2015, CCIS 579, pp. 17–31, 2015

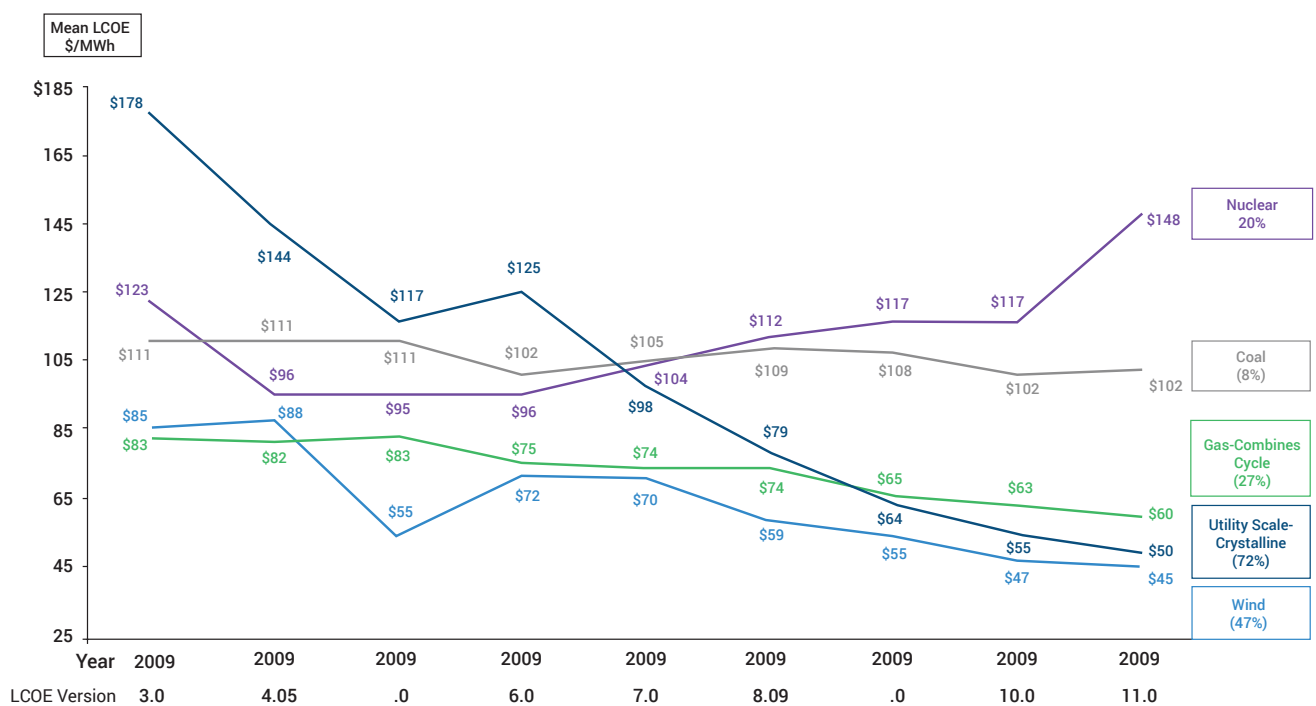
area surrounding cities. The development of renewable energy was until recent times considered to be desirable but challenging in economic cost terms but recent developments in technologies and energy markets mean that renewables are becoming significantly cheaper than conventional power generation sources in straight economic terms regardless of subsidies or the consideration of the cost of pollution and other social and environmental impacts (see Figure 8).

number of international examples of good practice that show that a coherent approach that integrates climate and disaster resilience into wider development policies and plans can be created. Two things, above all, are needed for this: flexibility in planning and decision-making and the involvement of as wide a range of stakeholders at all levels from the central government to local communities as possible. The development of a consensus on such an approach will need to be built over time and will benefit from examples of good practice at the national level to complement those available internationally.

Overall, the concept of resilience within a Metropolitan Region context is becoming more fully understood and accepted. Though experiences are limited, there are a

Renewable Energy - Historical Cost Declines

Selected Historical Mean LCOE Values ⁽²⁾



Source: Lazard estimates.

Note: Reflects average of unsubsidized high and low LCOE range for given version of LCOE study.

- (1) Primarily relates to North American alternative energy landscape, but reflects broader/global cost declines.
- (2) Reflects total decrease in mean LCOE since the later of Lazard's LCOE - Version 3.0 or the first year Lazard has tracked the relevant technology.
- (3) Reflects mean of fixed tilt (high end) and single axis tracking (low end) crystalline PV installations.

Figure 8: Global Cost Trends in Electricity Generation



Da Nang City

The development of strategies and actions to strengthen the ability of cities and their surrounding regions to respond to and plan for risks that stem from climate change and natural hazards will work within a national policy framework that will go far to determine what is or is not possible on the ground. It is likely that there will be a need for innovations in some aspects of national policies but these innovations will need to work within and build on the existing policy framework. These issues are multi-dimensional and will be affected by a number of different policy areas: one key issue moving forward will be the coherence of coordination between these different policy areas, many of which are the responsibility of different ministries and agencies.

The recognition of the need for this approach at the highest level of government is reflected in the publication of a very recent document by the Prime Minister's Office: Resolution 120/NQ-CP on Sustainable and Climate-Resilient Development in the Mekong Delta of Viet Nam, which was signed on 17th November 2017. This Resolution recognizes the Mekong Delta as both of key importance for national development and as particularly vulnerable to disasters and climate change impacts. It also recognizes that human actions exacerbate these risks and create new ones such as pollution, increased salt water intrusion, the loss of forest cover and ecological imbalances. The Resolution defines a vision for the development of a more "sustainable, safe and prosperous Mekong Delta" and sets out a number of measures through which this can be achieved. These measures specify responsibilities for government agencies at the national level (such as the Ministry of Construction, Ministry of Industry and Trade and Ministry of Agriculture and Rural Development) and for the People's Committees of the cities and provinces of the Delta. The central need for more effective cooperation within and between these different levels of government, as well as with the private sector and local communities, is a central tenet of the Resolution and will need, if it is to be achieved, actions to ensure this comes about at both national and decentralized levels of government.

This chapter presents a detailed discussion of the existing national policy framework as an essential starting point for understanding what will need to be done in the future to develop the policy environment for strengthening resilience in Metropolitan Regions in Vietnam. It includes sections on the main policy arenas that have to be understood and integrated into the development of an overall policy framework for Metropolitan Areas and concludes with a discussion on the challenges and opportunities for more effective integration between these different policy areas.

2.1 Urban Development Policies

The Ministry of Construction (MoC) is drafting the National Urban Development Strategy (NUDS) as a central instrument to urban development in partnership with both provincial and local levels. The process is managed under responsibility of the Urban Development Agency, within MoC. Pilot activities are being carried out in six provinces to test approaches for inclusion in the strategy. The NUDS will provide a basis for mobilizing resources for the effective further development of the national urban system. It is intended to achieve formal, compulsory legal status as a Decision of the Prime Minister in 2018.

The process will involve identifying the critical links between the national policy level and the provincial and local operational levels. As a consequence, the key outcome of NUDS would be a detailed picture of the urbanization process in Vietnam, the Strategy Statements, and the Guidelines and Toolkits for the provinces. Together these can be considered as a basis to prepare budgeting and resource allocations through provincial governments for the future development of the urban areas. In addition, the process provides an opportunity for developing a new approach to urban development based on strengthening resilience and adaptability.

Presently, MoC with the support of GIZ is drafting the new law on urban development management. This law establishes state management responsibility in the development, investment and financial and human resources for the development of urban infrastructure. Importantly, national leaders are committed to including new models of urban development in the new law such as urban resilience cities, green growth and SMART cities. The draft law has been submitted to the Standing Committee of the National Assembly by the Government in the end of March, 2018 and will be submitted to the National Assembly in the end of May, 2018.

Article 15 on main principles for Green Growth Cities (GG), SMART Cities (SM) and Urban Resilient Cities (RC) to cope with climate change

- *GG, SC and RC must be integrated into orientation plans, master plans, urban development programmes, technical and human resource solutions*
- *RC must be established in provinces that have significant impacts from natural disasters*

- *SEDP and urban development programmes must include GG, SM and RC to cope with climate change (CC)*
- *The government must issue indicators, standards, evaluation tools for GG, SM and RC to cope with CC*
- *The government must encourage and create good conditions for state and public investors for the construction and development of GG, SM and RC*

Article 16 on encouragement and incentive mechanism for GG, SM and RC to cope with CC

- *GG, SM and RC will receive financial support from national target programmes, other sources as well socialisation is a priority*
- *Organisation and individuals who participate in construction and development of GG, SM and RC will receive the following:*
 - *Import, export and income tax benefits*
 - *Beneficial access to land according to the law*
 - *Low interest loans from banks, and other lending institutions*
 - *Imported equipment, vehicles and materials will be tax exempt*
- *The government must encourage and create good conditions to carry out research and develop technology for GG, SM and RC.*

The Prime Minister approved the National Strategy on Green Growth for the Period 2011- 2020 with Vision to 2050 with Decision No. 1393/QĐ-TTg on the 25th September, 2012. The strategy presents that green growth is an important part of sustainable development and ensures rapid, effective, sustainable economic development and significantly contributes to the implementation of the national strategy on climate change. Objectives and tasks include:



Closing Workshop of the Wastewater Management Programme

1. *Period 2011 - 2020: Reducing greenhouse gas emissions intensity by 8 - 10% compared to 2010, reducing energy consumption on GDP by 1 - 1.5% per year.*
2. *Orientation to 2030: Reducing greenhouse gas emissions each year at least 1.5 - 2%,*
3. *Orientation to 2050: Reducing greenhouse gas emissions each year by 1.5 - 2%*
4. *Implement a strategy to "clean industrialization" through reviewing and adjusting the existing sector planning, efficiently using natural resources, actively preventing and treating pollution.*
5. *Key targets for urban centres by 2020 include: The rate of grade III urban center with wastewater treatment system meeting prescribed standards: 60%, with grade IV and V and the handicraft village: 40%, improving the environment polluted area by 100%, the proportion of waste collected and treated up to standard by Decision No. 2149/QĐ-TTg, the green area at the corresponding urban standards, the percentage of public transport services in large and medium-sized urban center by 35 - 45%, the percentage of large and medium-sized urban centers meeting the criteria of a green urban center striving to reach 50%.*

The Prime Minister approved Decision 1819/QĐ-TTg on the 26th October 2015, which outlines the national programme on the application of information technology and the piloting of SMART cities in at least three metropolitan regions in Vietnam. On the 1st December 2016 the Office



of the Government issues Decision 10384/VPCP-KGVX to encourage the construction and sustainable development of SMART cities in Vietnam. The decision indicates that the Ministry of Information to take lead responsibility with support from the Ministry of Construction to establish assessment criteria and standards for SMART cities and provide implementation guidelines to provincial governments.

Smart Cities

There is a disconnect between the current urban governance systems (planning and finance) and those required by vibrant towns and cities in a market economy, in particular when adding the uncertainties created by climate change

and other factors. Three main pieces of legislation that are still in force have a decisive impact on urban development. These provide the guidance and incentives for urban managers, and are the basis for decision making on investment:

- i. **The Land Law** effective since July 2014 is promoted and monitored by the Ministry of Natural Resources and Environment (MONRE). The Land Law controls development through the critical process of issuing Land Use Right Certificates; the classification between the categories of agricultural land, non-agricultural and unused land; and the hierarchy of land use plans.
- ii. **The Urban Planning Law** 2009, promoted by MOC. It defines types of urban plans and procedures for plan making; urban design; and urban technical infrastructure planning. The law defines “general plans” (used to be construction master plans), the new concept of “zoning plans”, and the “detailed plans”, on which eventually the critical construction permit is based.
- iii. **The Urban Classification System**, defined in Decree 42 of May 2009 and the Resolution No. 1210/2016/UBTVQH dated 25/5/2016 identifying six classes of urban settlements, setting conditions for “grading” into each class, based on certain indicators (set out in Circular 34). This classification system drives spatial development, often in unforeseen directions.

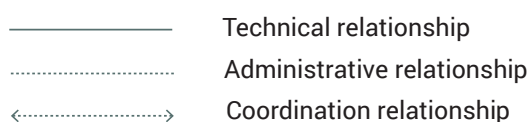
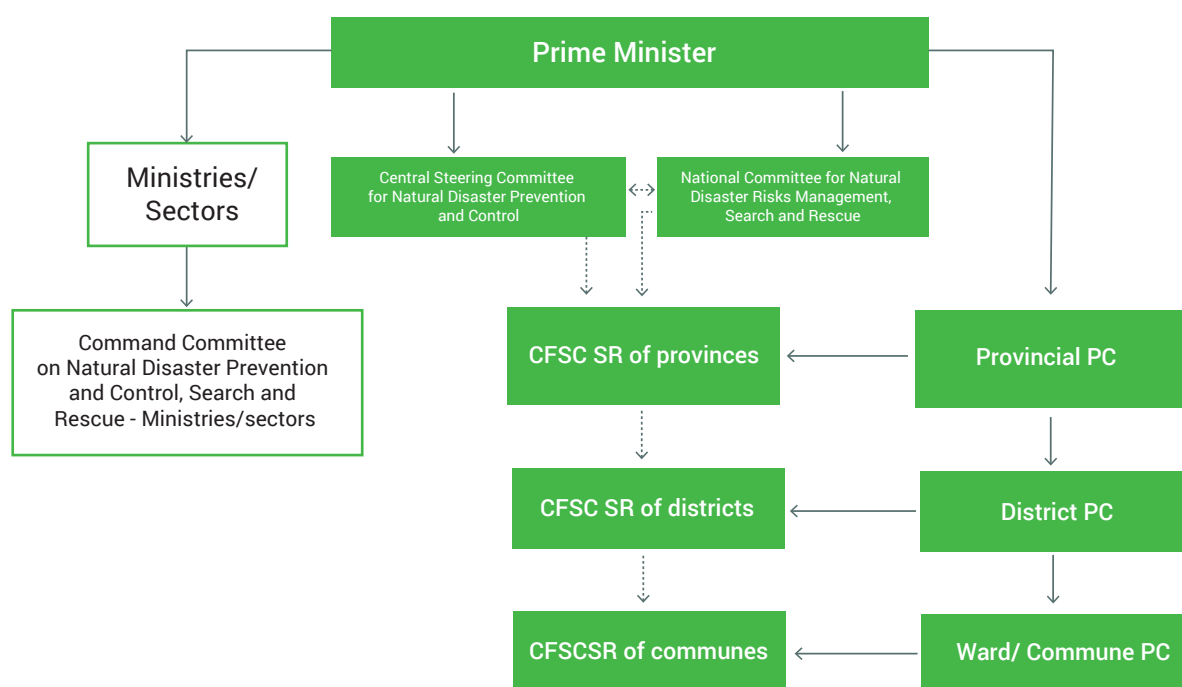
2.2 Disaster Risk Management

Flood warning and strengthening disaster risk management (DRM) has been a priority in the government's development agenda. In 1990, the government established the Central Committee for Flood and Storm Control (CCFSC) - a cross-ministerial agency with subordinate provincial and local committees. After many changes over the years, the organizational structure has clear and specific tasks, roles, mandates assigned to CCFSC and CFSCSR at local level. Institutional capacity and resources available for the agency to carry out its mandate were limited. The existing institutional structure is presented below with both vertical and horizontal coordination mechanisms.

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At national level, the disaster management and search and rescue belong to distinctive agencies namely CCFSC and National Committee for Search and Rescue, at provincial level, the two functions are integrated in one as the provincial Committee for Flood Storm Control and Search Rescue (CFSCSR). The Committee for Flood and Storm Control and Search Rescue is established to support the same level of the People's Committee to implement natural disaster prevention, response and mitigation. DARD is the standing body of the provincial CFSCSR. The standing office is the Division of Dyke Management and Flood, Storm Control or Division of Water Resources working on a part-time basis.

Institutional Structure on Natural Disaster Management, Search and Rescue



The system of CFSCSR is important for sharing information on damage and also relief needs, communicating early warning information across provinces and regions, damage assessments, coordinating rescue during floods, and protecting dykes and other infrastructure. Vietnam's mass organizations are also crucial in disaster response, with the Fatherland Front raising and dispersing considerable relief funds and supplies. The Vietnam Red Cross is operating throughout the country from national to commune level and works on awareness raising, disaster preparedness, response and prevention.

The government issued the National Strategy for Disaster Prevention, Response and Mitigation to 2020 on the 17th November 2007 and had the important objective to enhance the capacities of forecasting the impacts of flood, storm, drought, and seawater intrusion. In 2009, to support the implementation of the strategy, the government issued Decision No. 1002/2009/QĐ-TTg approving the Program "Raising public awareness and strengthening the community based disaster risk management capacity". The strategy was an important first step and outlined an extensive way forward for the sector. However, many of the objectives and goals were too ambitious and could not be implemented because of lack of budget. The Government issued the Decision No. 46/2014/QĐ-TTg dated 15 August, 2014 providing for natural disaster forecasting, warning and communication. MoNRE issued Document No. 01/VBHN-BTNMT dated 26/4/2014 - Circular detailing the implementation of communication regulations of tropical depression, storms and floods, the roles and responsibilities of government steering organizations and organizations that disseminate emergency announcements to mass organization and communities, and the formal process to issue emergency announcements.

On the 19th June 2013 the National Assembly promulgated the Law on Natural Disaster Prevention and Control. The law indicates the rights and duties of government, organizations, households and persons in participation of natural disaster prevention and control as well as state management responsibilities and the allocation of resources. To guide the implementation of some articles of the Law the government issued Decree 66/2014/ND-CP on the 4th July 2014. The decree covers responsibilities for the following:

- *Information transmission, frequency and length of time for information transmission,*
- *Communication networks and equipment for service to respond to natural disasters,*

- *Allocation of assignment and decentralization of responsibilities and coordination for natural disaster response,*
- *Mobilization, fundraising and allocation of resources for relief and support to respond to the consequences of natural disasters;*
- *Rights and obligations of foreign organizations and individuals and international organizations participating in the disaster emergency response and relief of the consequences of natural disasters in Vietnam,*
- *Organizational structure and tasks of steering agencies for natural disaster prevention and control and the mechanism of coordination between the Central Steering Committee for Natural Disaster Prevention and Control and the National Committee for Search and Rescue.*

Decision 44/2014/QĐ-TTg issued by the government on the 15th August 2014 builds on Decree 66 and presents the standards and specifications for each level and type of natural disaster, for example droughts, saltwater intrusion and floods.

On the 6th June 2016 the Ministry of Planning and Investment issued Circular 05/2016/TT-BKHDT that provides guidelines for all levels of government to include natural disaster response measures in relevant master development plans, sector development plans and annual and five yearly socio-economic development plans. The new policy enables provincial departments and agencies to integrate natural disaster response activities into annual and long-term government planning and budgeting.

The Law on Natural Disaster Prevention and Control presented the first comprehensive legal framework for the sector. Based on this law ministries established a detailed policy framework, which provided guidelines for the implementation of government and donor projects and programmes. An important part of this framework was the emphasis on shifting from traditional water level and rain water measurement methods for forecasting emergencies to the faster, automated early warning system, which provided quicker emergency alerts for government, private industry and people. Quicker alerts result in quicker response time which means people can move to safety in time, help protect their means of production and livelihoods, and other household assets and so recover quickly. People also have more time to help each other and the communities they live in. Damage from floods is minimized and so recovery from disasters is quicker.

2.3 Climate Change

MONRE is the lead ministry for climate change. MONRE is established in 2002, responsible for land administration (including the designation of land uses) and environmental management and protection (including environmental standards for water, air, and soil). It recently added to this portfolio the coordination and supervision of the national response to climate change and in particular, the implementation of the National Target Program to Respond to Climate Change (including guidelines for the preparation of ministries/sectors and provincial action plans and its own national and regional climate change and hazard scenarios)

Among its management, the following units with climate change responsibilities are: The Department of Climate Change was established on 25 May, 2017 under MONRE. It provides advisory services and support to the Minister in state management over climate change, ozone layer protection, public services on climate change in accordance to the law. Functions, responsibilities, mandates and organizational structure of the Department is defined in the Decision No. 1266/QĐ-BTNMT dated 25 May, 2017 by the Minister of Natural Resources and Environment.

The Agency of Meteorology and Hydrology is an agency under MONRE. It was established on 13 January, 2018 to provide advisory services and support to the Minister in state management and legal enforcement in meteorology and hydrology nationwide; management



The German Ambassador, Swiss Ambassador and leadership of the Committee on Science, Technology and Environment, National Assembly launching the Book "Climate Change Adaptation in Vietnam"

of public services in the area of the Department according to the law. Functions, responsibilities, mandates and organizational structure of the Department is defined in the Decision No. 03/2018/QĐ-TTg dated 25 May, 2017 by the Prime Minister.

The Department of Water Resources Management is responsible for management of water resources and their allocation to different users. This includes licensing for water use and wastewater discharge and developing legal instruments for water resources management that will supply users with adequate water resources while preventing floods and drought. It includes a Bureau for Planning and Policy, and two Bureaus for Surface Water and Groundwater Management respectively. While MONRE is managing the surface and underground water, and MARD are responsible for water resources for agriculture purpose; The Vietnam Institute of Meteorology, Hydrology and Environment (IMHEN) is a research institution under MONRE established in 1977. With over 100 researchers it is registered with the Ministry of Science and Technology for its R&D activities. It is a key resource for MONRE with a mandate for research, policy development, training, and consultancy services related to water resources, meteorology, hydrology, oceanography, and the environment. It was responsible for drafting the NTP-RCC and most recently, has prepared the climate change projections for MONRE and donors operating in Vietnam, including scenario forecasts for Vietnam, with the first version in 2009 and second version in late 2011.

MARD is assigned as the leading agency for the CCFSC. The Minister of MARD is the vice Chairman of the CCFSC. It has three big Directorate, including Directorate of Water Resources, Directorate of Fishery, Directorate of Forestry. All the Directorates have some impacts on and are impacted by CC and DRM. The Directorate of Water Resources is the technical agency and resident body for disaster risk management (mostly water-related disasters: flood, flash flood, typhoon, storm, tsunamis and earthquakes). As this agency plays the technical role in DRM, most legal documents, policies, strategies, programs are developed and/or approved by it (or if it is out of its power, to be approved by MARD Minister or Deputy Prime Minister or even the Prime Minister). Of course, alike in other countries, any law must be discussed and approved by the National Assembly. Vietnam Disaster Management Authority (DMA) was established on 23 July, 2017 under MARD. It provides advisory services and support to the Minister of Agriculture and Rural Development on state management in the management and enforcement of legislation in disaster prevention and dyke management in Vietnam as well as other public services under the responsibility of the Authority. The functions,

responsibilities, mandates and organizational structure of the Authority is defined in the Decision No. 26/2017/QĐ-TTg dated 3 July 2017 by the Prime Minister. The Center for Policies and Techniques for Natural Disasters Management is a unit under the DMA. It has the function of performing state management and public services on disaster prevention and control, dyke management, application of science and technology, technology transfer, policy advice, construction and investment advice in disaster risk and dyke management in response to climate change and sea level rise as defined by the law. Department of Science, Technology and Environment is a technical agency in charge of climate change, specifically to develop the Action plan Framework for MARD to response to CC. The CCAP of MARD was developed in 2008.

National:

The National Target Programme for the Response to Climate Change (NTP-RCC) was established in 2008 and is administered through a program secretariat located within MoNRE, and reports to a National Committee for Climate Change (NCCC) chaired by the Prime Minister. The secretariat seconds technical staff from MoNRE as required, it has no permanent staff of its own. Policy and state management regulations supporting the implementation of the NTP-RCC are issued by MoNRE. Other ministries are members of the NCCC and have prepared Climate Change Action Plans.

In 2015, the National Assembly issued the Law on Meteorology and Hydrology which includes a Chapter on Climate Change. The Government of Vietnam has established a policy and legal framework dealing with the climate change in Vietnam. The 2011-2015 National Socio-Economic Development Plan indicates that climate change as a significant threat to development and reaffirms commitments on improved natural resource and disaster risk management.

The National Action Plan on Climate Change 2012-2020 indicates the roles and responsibilities of ministries, for example Climate Change Action Plan in the Ministry of Construction (MoC) includes the following:

- *Actively respond to disasters; inundation proofing for large cities;*
- *Adjust the plans, regulations, technical guidance for construction for the areas frequently affected by disasters in accordance with the conditions of climate change and sea level rise;*
- *Investment for upgrading and construction of flood control projects for major cities in order to proactively respond to the disasters due to climate change;*
- *Enhance the ability to respond to emergency disaster situations;*
- *Implementation of mitigation of greenhouse gas emissions and developing the economy towards a low-carbon;*
- *Implementation of measures to mitigate greenhouse gas emissions from production activities;*
- *In accordance with the conditions of Vietnam, step by step transfer of climate-friendly technologies in the framework of the Framework Convention United Nations on climate change;*
- *Implement greenhouse gas emission mitigation project consistent with the financial support of international and technology; Implementation of modern technologies of waste and garbage.*

The overall objective of the National Green Growth Strategy approved in 2012 is to achieve a low carbon economy and to enrich natural resources. This will become the principal direction in sustainable economic development; reduction of greenhouse gas emissions and increased capability to absorb greenhouse gas are gradually becoming compulsory and important indicators in socio-economic development.

MoNRE Decision No. 3815/BTNMT-KTTVBDKH dated 13th October 2009 provided guidance to provinces to prepare their initial Climate Change Action Plans (CCAPs). Many of the good practices identified from international review were widely applied in the drafting of the CCAPs including appropriate application of climate data to impact and vulnerability assessment;

assignment of responsibilities for implementation; and engagement with stakeholders outside government. However, in general there was limited attention to how the plan would be implemented or monitored and the plan has not been used for guiding provincial funding decisions or supporting economic development plans. During this planning process, DoNRE and PPC were mainly concerned with meeting the new requirements imposed by MoNRE through the NTP-RCC.

The Government of Vietnam issued Decision 2623/QD-TTg on the 31st December 2013 to approve the MoC plan, "Develop Urban Centres in Vietnam Respond to Climate Change 2013-2020". The objective of the Decision is to take the initiative and use natural resources to improve and develop urban centres to respond to climate change; to establish the comprehensive legal and policy framework including urban planning and investment in urban development in response to increased risk of climate change, capacity development and improved ministerial coordination.

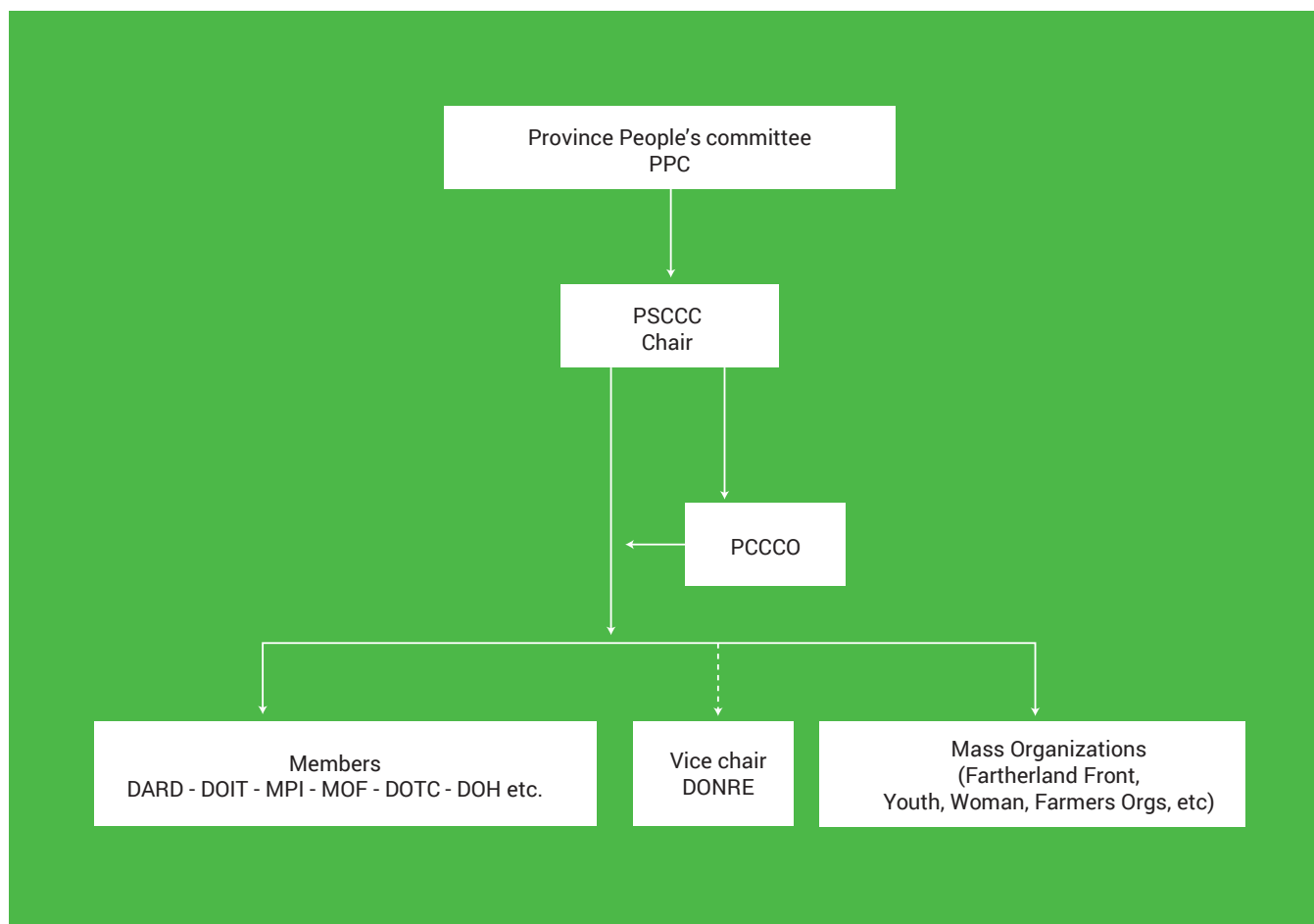
MPI issued Decision 1485/QD-BKHDT on the 17th October 2013 to provide a framework for the selection of climate change response priorities for inclusion to develop the annual socio-economic development plan. This plan is the main planning and budgeting tool for provincial development.

Institutional Arrangements

National level

In January 2012, the National Climate Change Committee (NCCC) has been established. According to the Decision No.321/QD-TTg dated 13 March, 2017, the Chairman of the Committee is Prime Minister Nguyen Xuan Phuc, the Standing Chairmen of the Committee are Deputy Prime Minister Trinh Dinh Dung and Minister of Natural Resources and Environment; Members are Ministers of 12 Ministries³⁸. The NCCC Office is established with the function of assistant agency for NCCC. NCCC Office is located in MONRE and headed by Climate Change Department, MONRE.

³⁸Ministers of Government Office; Planning and Investment (MPI); Finance (MOF); Science and Technology (MOST); Foreign Affairs (MOFA); Agriculture and Rural Development (MARD); Defense (MOD); Police (MOP); Construction (MOC); Transportation and Communication (MOTC); Health (MOH); and Industry and Trade (MOIT).



Under direction of Government of Vietnam, most ministries have established a Steering Committee for Climate Change (SCCC).

At the provincial level, Provincial Steering Committee for Climate Change (PSCCC) and Province Climate change Coordination Office (PCCCO) are established in 63 provinces.

Following are two diagrams of PSCCC.

Organization chart of PSCCC:

- 1) Chair: Vice Chairman of PPC
- 2) Vice Chair: Standing Vice-Chair: Director/Vice Director of DONRE
- 3) Members: Leaders are representatives from DPI, DOFA, DARD, DOC&P, DOIT, DOF, DOT&C, etc. and Representatives from Mass's organizations in province (Woman's, Youth's, Father's Land organizations)

PSCCC is responsible for supporting Province People's Committee in directing the departments, sectors, local

organizations in the province to organize the implementation of activities/programmes indicated in the Provincial Action Plan to Respond to Climate Change. It provides the guidance to solve outstanding issues, evaluating and monitoring the progress of implementation of programmes/projects relating to climate change and reporting to PPC.

Note: Most provinces use the same institutional structure. Hai Duong was an exception, where the PPC decided to establish a working group instead of a Steering Committee.

Organization of PCCCO

PCCCO: is the supporting body for PSCCC in implementation of the NTP RCC in provinces. PCCCO has the function of advising and assisting the PSCC to coordinate the activities of the programs and projects on climate change in the province.

The PCCCO has legal status, seal and separate accounts at commercial banks and the State Treasury in accordance with the law. Director, coordinator or/and employees of PCCCO working on full-time and part-time basic depending on the requirements of work. PCCCO's offices of 4 provinces are located at the Sea and Islands Sub-Department under DONRE.

Mandates and some main responsibilities of PCCCO include the following:

- To advise and assist the PSCC in planning the implementation of the NTPRCC in province and setting up the implementing arrangement of approved programmes/projects;
- To study and propose the mechanisms and policy to coordinate for effectively implementing the activities to respond to climate change in the province;
- To support the activities of national and international cooperation in the field of adaptation to climate change;
- To seek funding to improve the capacity of management and response to climate change.



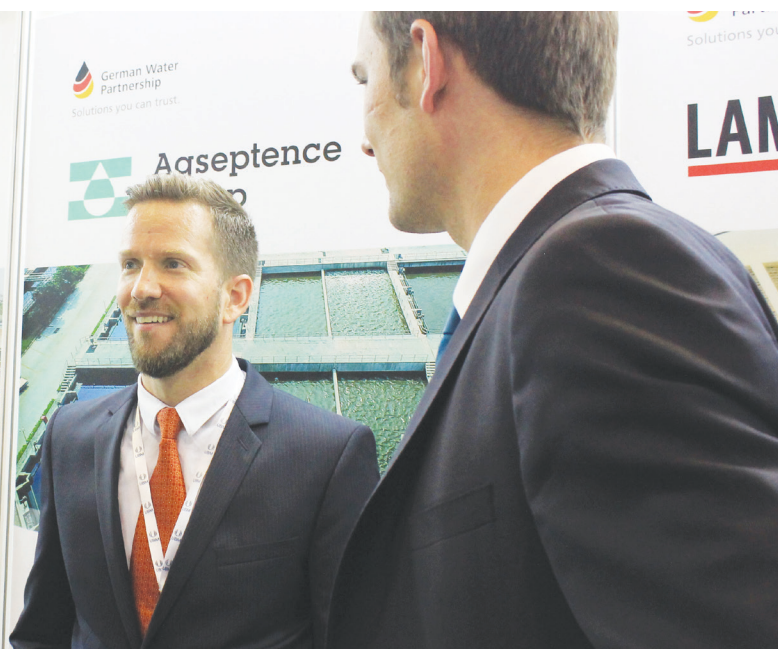
Provincial Climate Change Action Plan (CCAP):

The format of CCAP was not very different in the four project provinces, except the planned programmes/projects proposed for responding to climate change in each provinces. The content and budget of the CCAP from the 4 provinces is listed below:

The CCAP follows a guideline established by MONRE. The CCAP in provinces normally consists of five main parts, for example: 1) Climate change and climate change scenarios for the province; 2) Socio-economic development of the province during the period of CCAP and planning for year to be visioned (2000, 2030 or 2050); 3) Main directions and plan to respond to climate change; 4) Lists of programmes/projects with estimated budget; and 5) The institutional arrangement for implementation of CCAP of province.

The CCAPs were drafted by professional institutions of MONRE which were assigned by the governments for national climate activities.

The budget for implementation of CCAP are estimated by the agencies who proposed the programmes/projects but not based on the availability of financial and other resources of provinces and the possibility of support from central government, so for many reasons (preparation and approval of project/s takes a long time, and there are constraints of local and central budget etc. Many planned activities/programmes to respond to climate change in provinces can not be implemented as planned.



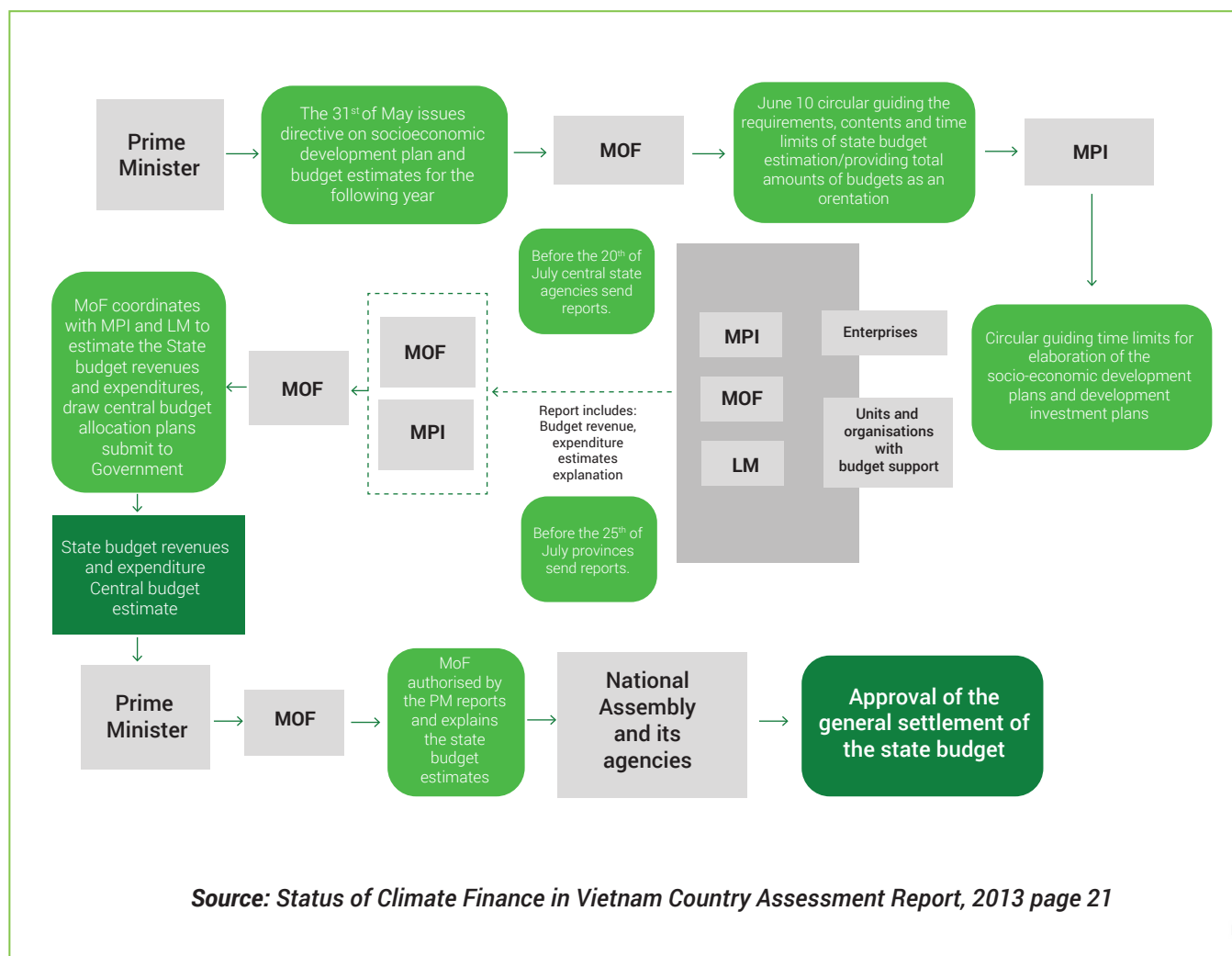
Dr. Dirk Pauschert, GIZ Programme Director is discussing about urban resilience with Mr. Gunther Adler - State Secretary of the German Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety

Financial Resources for Climate Change

National Level

The National Target Programme for the Response to Climate Change (NTP-RCC) indicates that climate funds enter Vietnam as part of usual Overseas Development Assistance (ODA). This makes it necessary to understand the process of public spending and the opportunities for integrating climate change aspects into budgetary systems, as well the processes donors must follow when financing climate change measures in Vietnam. For example, the SP-RCC programme assigns donor contributions to the central budget and the financial flow to selected projects follows ODA regulation.

The diagram below presents an overview for estimation and approval of state budget and central budget as stated in Decree No.60/2003/ND-CP of June 6, 2003 detailing and guiding the implementation of the state budget law.



Finance for Climate Change Measures

Various forms of Climate Change Finance have been introduced to meet increasing and diversified needs but there has been limited success so far with mainstreaming key national climate change financial goals and strategies at horizontal (line ministries) and vertical (sub-national) levels of government.⁴¹

- Government investment for Climate Change projects and programs (around \$1 billion annually);
- National Targeted Programs (NTP-RCC, Energy Efficiency, Reforestation);
- Projects and programs directly link to Climate Change and Green Growth;
- Current expenditure for research, capacity building projects;
- ODA: from 1993 of about \$2 billion under the forms of CC related projects & programs and budget support;
- Others: REDD+, Vietnam Environment Protection Fund, CDM.

⁴¹ See the report, Status of Climate Finance in Vietnam Country Assessment Report, August 2013, for a detailed summary of financing mechanisms and processes in Vietnam.

Government and development partners conducted a series of consultations in 2013 to develop a strategy for climate change financing. The results of these consultations are presented below:

- Assessing existing expenditures on climate and green growth;
- UNDP and WB supported Climate Public Expenditure and Investment Review (has been initiated);
- Improving access to climate finance;
- Establish the Vietnam Climate Finance Options Framework (inception workshop March 26, 2013);
- In collaboration with UNEP and Frankfurt School of Finance and Business develop green growth/climate financing mechanisms;
- MPI DSENRE is a member of the Steering Committee for the Asia Low Emission Development Strategies Partnership Forum – a partner network of the LEADS Global Partnership;
- Work with sectors and provinces to set targets and identify policy actions and investments;
- Work on developing the MACC (Marginal Abatement Cost Curve) findings into investments and policy actions;
- Develop synergies between existing work at sectoral level (agriculture and rural development, renewable energy, green industry strategy).



GIZ and SECO leadership takes part in the opening ceremony of the fifth plenary session of Viet Nam's 14th National Assembly

Present challenges identified by the consultant team in national level climate change finance include the following:

- *Establishing clear rules and mechanisms for key ministries, such as MONRE, MARD, MoC, MPI, MoF, to cooperate and coordinate together in shaping the national climate finance architecture and implementing arrangements such as the NTP-RCC and SP-RCC. Indicating financial arrangements for this cooperation will be essential. Staff have been assigned by each organisation but with unclear financial arrangements it is difficult to plan joint activities*
- *Developing robust cost estimates on national climate change resourcing needs. This requires an appropriate methodology and cost norms that takes into account multi-sectorial and provincial level adaptation needs and aligns these with national strategies. MONRE, MPI, and the MoF should be supported in creating and piloting such a tool and process.*
- *Strengthening advisory services of relevant government agencies such as the PCU or the VEPF by establishing and maintaining a database on implementation between Policy Actions, action plans and other policy changes to facilitate monitoring activities. The integration of climate change measures into the annual socio-economic development plan and budget is critical.*
- *Establishing coordination and collaboration between MONRE, MPI, MoF (and sectorial ministries relevant to National Appropriate Mitigation Action (NAMA) development) on national NAMA framework development. The NAMA process should also develop mechanisms for involving private sector stakeholders and donor organization.*

2.4 Environmental Protection

The overall environmental protection system in Vietnam centres on the 2014 Law on Environmental Protection (No. 55/2014/QH13, passed on June 23rd 2014) which, in turn, replaced the 2005 Law on Environmental Protection (LEP). The 2014 law also built on the issues identified in the 2012 Decision (No. 1216/QĐ-TTg) "Approving the Strategy for Protecting the National Environment by 2020 and the Orientation Towards 2030. The 2 LEPs and the 2012 Decision provide a series of statutory provisions on different aspects of environmental protection and defined the rights and responsibilities of different "regulatory bodies, agencies, organizations, households and individuals" in relation to the protection and conservation of different aspects of the environment. These rights and responsibilities are defined within the LEP in a sustainable development context which

seeks "a close and harmonious cooperation amongst the economic growth, social progress and environmental protection", thereby reflecting the overall development paradigm set for Vietnam.

The LEP states that organizations or individuals who use or profit from environmental resources are obliged to make a financial contribution to environmental protection, and that anyone causing environmental degradation or pollution is obliged to find and pay for remedial solutions to address the damage they cause. The LEP consequently makes the environment everybody's business and protection environmental resources to be everybody's responsibility. It creates an overarching framework within which coordination between different entities on the management and protection of natural resources can take place. As part of this, it states that all parties should "extract and use natural resources in a proper and economical manner; develop green and renewable energy; strengthen recycling, reuse and reduce waste substances to a minimum". The LEP also states that the Government of Vietnam will reserve a specified amount in national budgets for different environmental protection activities and that this amount will increase in line with economic growth.

One important aspect of the LEP for this report is that it states that the approach will be to combine environmental and natural resource protection activities with responses to climate change and to risks associated with natural disasters. The LEP consequently takes a resilience approach (even if this language is not used) where it seeks to ensure that individuals, communities and society as a whole is resilient to and seeks to mitigate both short-term environmental shocks (whether from pollution, extreme events or other sources) and the long-term maintenance of environmental integrity within the context of climate change, pressures on the exploitation of natural resources and other potentially disruptive long-term trends.

In relation to the development of Metropolitan Regions, the LEP also states that all spatial and development planning must include the consideration of measures to ensure the prevention and, where possible, reversal of environmental degradation and the sustainable management of natural resources. There are specific groups of measures on a number of urban environmental issues, including improving urban air pollution, improving hygiene, water supply, sewerage and solid waste disposal. Energy efficiency and sustainable consumption patterns, both issues of critical importance in growing and increasingly prosperous cities, are identified as important strategic issues in the LEP.

Climate change mitigation and adaptation are, as can be expected, also prominent issues in the law, including the provision that “all activities relating to the environmental protection must be harmoniously connected with the response to climate change”. As part of this, the law includes the requirement that “Ministries, quasi-ministerial organs and People’s Committees at all administrative levels shall design and develop the action plan for the environmental protection and response to climate change within their area of competence”. The implication is that any approach to the planning and management of Metropolitan Regions must include specific measures on both climate change and environmental management and protection.

The LEP is supplemented by a number of other policy documents related to different aspects of environmental protection, including the policies on green growth and climate change discussed above. The 2007 Decision Approving Vietnam’s Forestry Development Strategy in the 2006-2020 Period established the policy framework and regulations for the management of forest resources, including targets for forest cover over time and the identification of different types of forest based on the uses that were permitted in each area. The 2010 Environmental Protection Tax law established the legal basis for the different types of taxes and levies

that could be charged for the use of and damage to natural resources and the environment. The 2012 Law on Water Resources sets the framework for the regulation and management of all aspects of water resources throughout the country. This includes the definition of responsibilities for water resources at different levels in the administrative system and the establishment of water resources strategies and master plans. Taken together, the LEP and the other more specific policies and laws constitute a comprehensive policy framework for environmental management and protection in Vietnam.



Guests and participants at the Launching Ceremony of the Book “Climate Change Adaptation in Vietnam”

3.1 Introduction

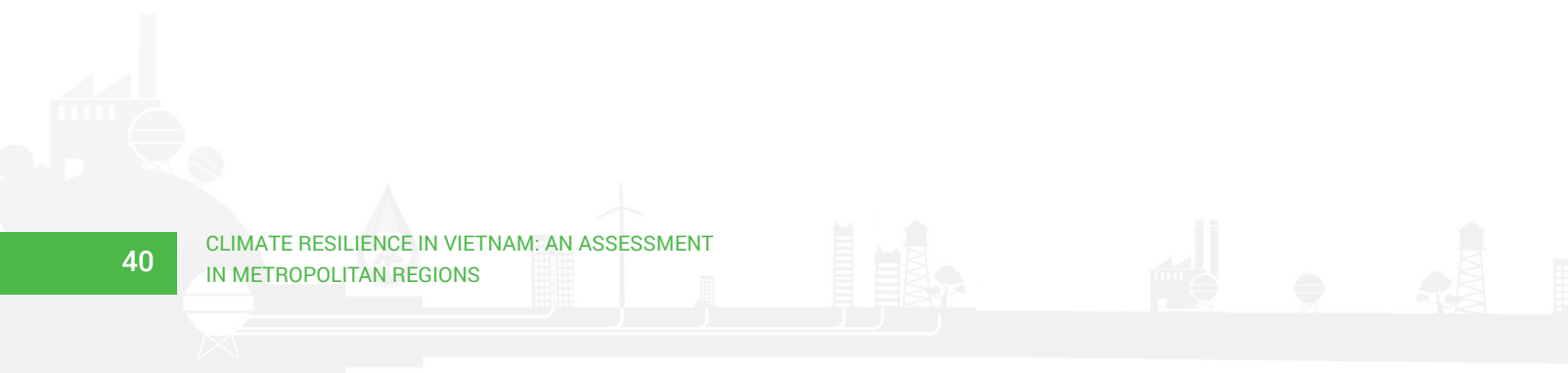
The rationale for strengthening the resilience of Metropolitan Regions in Vietnam in response to a range of both short and long term climate-induced and other risks is clear, as is the policy basis of such an approach as it would reflect very clearly national priorities in the move to sustainable development, green growth and responses to climate change. It would also reflect the parallel policy goals of, firstly, greater decentralization and community-based development and, secondly, the establishment of more effective coordination and coherence between different branches of the government and with non-state agencies including the private sector and community groups. The overall intent is clear but the challenge is to establish the most effective steps to achieve this outcome.

On the face of it, building a more effective resilience system in Metropolitan Regions would need a comprehensive and far-reaching reform of the administrative and planning system but the most effective strategy will be to build such processes gradually, working with specific issues that are both relevant and important in their own right and also part of a wider process of strengthening resilience. This practical, incremental approach is one that is more likely to succeed in

the long term and is more acceptable to many different stakeholders in the short term. It allows decision makers to prioritize the areas where actions are taken to reflect the issues where the most immediate challenges are felt and it forms a basis for building collaboration and coherence in planning and management in identifiable and understandable stages where the benefits of such actions are clear and outweigh the institutional and other costs involved.

A number of such action areas are discussed in this section. It is not suggested that these are the only possible areas of action or even that they are the clearest priorities for introducing change. They are all felt to reflect clear present challenges and are all areas of action where a Metropolitan Region approach has clear advantages over the existing, somewhat fragmented administrative structure. The issues that are discussed are:

- Flood and disaster risk management
- Extending insurance coverage in response to climate-related hazards
- Coastal area development as zones of high risk and vulnerability
- The identification of vulnerability and resilience indicators and mapping





Ms. Luisa Bergfeld, First Secretary of German Embassy and GIZ meet with Deputy Prime Minister Vuong Dinh Hue and leaders of some ministries at Mekong Delta Forum, September, 2017

3.2 Flood and Disaster Risk Management

Vietnam has had an established and evolving disaster risk management (DRM) system for some considerable time. The basis for the system dates from Decree No. 168-HDBT (May 19, 1990), which established and outlined the key elements of a DRM system and defined the of a new central body, the Central Committee of Storm and Flood Control (CCSFC), and committees and sectors at all levels (provincial, district and commune). The central level committee's main function is to act as a coordinating body for DRM efforts in Vietnam. It is based in the Ministry of Agriculture and Rural Development (MARD) and is responsible for the formulation of regulations and mitigation measures related in particular to floods and cyclones. It coordinated the preparation of the

first National Strategy and Action Plan for Mitigating Water Disaster, published in 1994, and the National Strategy for Natural Disaster Prevention, response and mitigation to 2020 that was approved by the Prime Minister on 16 November 2007. The system that has been established is comprehensive but is also complex, centralized and subject to major challenges of coordination and clarity of roles and responsibilities, issues that have been increasingly recognized.



Meeting with the Working Group of An Giang Province

The emphasis in the initial period of the DRM system in Vietnam was two-fold:

(i) a prediction and response approach which emphasized relief and recovery efforts;

(ii) strategic investments in infrastructure, especially dikes, which fell under the responsibility of MARD to implement and maintain. The importance of the system was emphasized by regular disasters due to floods and cyclones that affected all parts of the country and that were seen to have an impact on overall national development in addition to the direct impact on people and communities hit by the individual events.

The system continued to develop as experience accumulated, at times with support from international development partners who, amongst other things, brought international experience to the emerging Vietnamese system. This was reflected in the National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020 that was approved by the Prime Minister on 16 November 2007. This represented the first stage of a significant shift from ex-post disaster relief and response to ex-ante risk reduction through preparedness and resilience. This was further consolidated by the 2012 a National Action Plan for Climate Change which emphasized preparedness as part of the overall development planning approach.

The development of the DRM system in Vietnam was consolidated in the 2013 Law on Disaster Prevention and Control (Order no. 07/2013/L-CTN, which came into effect on 1st May 2014). The law contains 47 articles that include provisions on disaster risk reduction, climate change adaptation and mitigation measures, from national to local and community levels. Article 4 states the basic principle behind the law as being the “*Proactive prevention, timely response to, and urgent and effective remediation of consequences of natural disasters*”.

The Law outlines natural disaster prevention and control activities, including a national strategy and plans, and measures on the integration of disaster prevention into national and local socio-economic development plans. The Law assigns roles and responsibilities among ministries and other key actors in preventing and responding to disasters, including the participation of international stakeholders. It designates MARD as responsible for programmes of awareness raising and community-based natural disaster management, with a special

emphasis placed on vulnerable groups. The law also provides for incentives for the provision of insurance against natural disaster risks. The 2013 law has been instrumental in providing greater clarity to the DRM system: as the Red Cross note: “although dispersed, and despite some gaps, this legal framework has been vital in Viet Nam’s substantial achievements in the area of DRR⁴⁰”.

The development of the DRM system in Vietnam has received substantial support from international development partners over a sustained period, support that has been instrumental in defining the directions in which the system has evolved. For example, UNDP Vietnam provided a three-year technical assistance project, entitled: “Strengthening institutional capacity for disaster risk management in Viet Nam, including climate change-related disasters” (SCDM Phase I) from 2008 to 2011. The focus of this programme was to develop the DRM system through strengthening the institutions at all levels that were responsible for operationalizing the national DRM system, recognizing this as a key constraint on the effectiveness of DRM in Vietnam. These activities were extended for a further four years with SCDM phase II, where, working in close partnership with MARD, Oxfam, the Vietnamese Red Cross and Vietnamese Women’s Union, there was a particular focus on the development of implementation guidelines, an M&E framework, training materials and financial implementation modalities for DRM in Vietnam. The UN Vietnam has also provided assistance to the government with the drafting of a law on DRM through their collaboration with MARD.

⁴⁰ International Federation of Red Cross and Red Crescent Societies (2014) Vietnam Country Case Study Report: How Law and Regulation Support DRR IFRCRC, Geneva.

The World Bank Disaster Risk Management Project helped to improve the disaster early warning and forecasting capacity in the south of Vietnam and also aimed to improve the planning capacity for integrated DRM at both national and provincial levels over a four years period up to the end of 2013. The project had four main components:

1

Prevention and Mitigation Investments, which invested close to \$87 million in both structural measures such as flood and storm control infrastructure and non-structural measures aimed at improving flood and storm monitoring, modeling and prediction capabilities.

2

Community-based Disaster Risk Management, which worked in 12 provinces to work with vulnerable communities to build their capacities to carry out risk reduction measures to reduce their vulnerability to disasters. This component led the government develop a National CBDRM Program of US\$450 million covering 6,000 communes across the country.

3

Post-Disaster Reconstruction Support for the rehabilitation of small public infrastructure following disasters to facilitate rapid recovery from their impacts.

4

Project management and institutional strengthening to ensure better coordination and integration among agencies and different levels responsible for prevention, response and recovery from disasters. This included technical assistance to mainstream natural disaster risk management into development planning and support the update and implementation of the Second National Disaster Mitigation Strategy and a comprehensive training programme focusing on the Flood and Storm Control Committees (FSCCs) at the local (including Communes, Districts, and Provinces) and central levels,



Technician testing a radar water level sensor in early warning system supported by GIZ in Phu Yen Province

The project's emphasis on community-based DRM and capacity development at the provincial level and below, both of which represent a significant development of the DRM system that had traditionally been seen as centralized and 'top-down' in its operation. The CBDRM approach promotes community participation and ownership and encourages communities and government to take a proactive approach to managing risks of natural disasters. A recent article⁴¹ noted that "The CBDRM activities directly support government efforts for sustainable development by helping reduce human, economic, and financial losses from disasters caused by nature in the target communes". This is in line with changes in the overall development approach in Vietnam which has increasingly emphasized decentralization and local level empowerment and responsibilities in many areas of life.

⁴¹ Huy Nguyen et al (2013) Community Based Disaster Risk Management in Vietnam, downloaded from the ResearchGate website November 2017.



Inhabitants of Jipapad, Philippines paddle through their submerged town

There have been a number of other initiatives supported by donors or international NGOs in DRM in Vietnam over the last two decades, all with the intent of developing capacities to address the high levels of risk different parts of the country face from natural disasters. Despite the progress made and the significant international support, a recent report⁴² notes that the national strategy identifies a series of challenges that Vietnam's DRM system needs to address if the existing approach is to develop into one that is more comprehensive in coverage and more effectively integrated into mainstream planning and management processes, including the nascent system for climate change adaptation:

- Strengthen institutional capacity and collaboration mechanisms amongst ministries and sectors.
- Develop financial allocation mechanism to meet the needs and effectiveness of Disaster Risk Management (DRM).
- Enhance and promote the effectiveness of Community Based Disaster Risk Management (CBDRM) to raise awareness to communities in responding to disasters.
- Establish early warning systems for disaster and climate change in highly prone areas.
- Develop an information sharing network between ministries, sectors, localities and NGOs to support the policy formulation process
- Enhance coordination of activities and promote the participation of multi-stakeholders.
- Strengthening public-private partnership in Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA).
- Improve scientific research and application of new modern technologies in DRM.
- Mobilize support, cooperation and assistance from international organizations, donors and NGOs in DRR and CCA.

⁴²Center for Excellence in Disaster Management and Humanitarian Assistance (2015) Vietnam Disaster Management Reference Handbook CEDMHA, Washington D.C.

This appears to be a formidable list but together the individual issues point in the same direction: the DRM system needs to evolve into a more locally-based system that involves multiple stakeholders and that is more closely integrated into overall development planning and natural resource management mechanisms, especially at the provincial or municipal level and below. The need for sustained capacity development is clear, as is the need for clarification of the roles and responsibilities of different ministries and other agencies.

Within the context of enhancing resilience in Metropolitan Regions, the focus of future efforts in DRM should reflect the national policy of integrating DRM more fully into mainstream development planning. The strengthening of resilience to natural disasters is a core issue for the direction of development these regions should take and, as such, DRM is an important entry point for the wider process of development of resilience. This in turn needs better coordination between different agencies and different levels of the administrative system.

The implication of this is that, whilst the structure of dedicated committees concerned with DRM has been important and will continue to have a central place in the system, it is equally important that DRM is not seen as their business alone. It is a core issue for all planning and development activities. This is particularly true in areas, such as the Mekong Delta and many coastal areas, which are particularly vulnerable to disaster risks and which, in consequence are where the development of more integrated systems to enhance resilience is most urgently needed.

3.3 Extending Insurance Cover in Response to Climate-Related Hazards

The issue of providing insurance to cover the impacts of extreme events such as storms and floods has been increasingly discussed internationally as the frequency and impact of such events increases and issues of building resilience are more widely considered. For countries such as Vietnam, much of the discussion is more general in nature and examples of practical and sustainable insurance systems are difficult to find. The role of insurance as part of a package of responses to climate change was recognised in the 2015 21st UNFCCC Conference of Parties in Paris, where 197 countries agreed that areas of international cooperation and facilitation to enhance understanding, action, and support regarding loss and damage that were a result of climate change impacts should include the following elements⁴³ :

- *Early warning systems*
- *Emergency preparedness*
- *Comprehensive risk assessment and management*
- *Risk insurance facilities, climate risk pooling and other insurance solutions*
- *Non-economic losses*
- *Resilience of communities, livelihoods, and ecosystems*

This reflects the fundamental characteristic of insurance, that it is a financial mechanism to share the potential costs of risks that could impact all the participating people or organizations but where the risks are usually long-term and are uncertain in terms of both who will be affected and how severe the impacts will be... "Insurance reduces the catastrophic impact of some extreme events by spreading losses among people, over large areas, and across time. Insurance tools motivate risk reduction and play a role in avoiding loss and damage. They can also help bridge financial gaps when losses occur"⁴⁴ .

⁴³ UNFCCC (2016) Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. FCCC/CP/2015/10/Add.1.

⁴⁴ Warner et al. (2012) Insurance Solutions in the Context of Climate Change-Related Loss and Damage. Policy Brief No. 6. Bonn: UNU-EHS



Mrs. Phan Thi My Linh - Vice Minister of Construction and relevant departments of MoC meet with the National Assembly of Vietnam on the draft Urban Development Management Law

There are some generic conclusions that can be drawn but much still needs to be done to develop a full understanding of the potential role of insurance in the establishment of resilience systems. The first overall conclusion is that insurance should not be considered in isolation but should rather be seen as part of an overall financial system for disaster risk management and strengthening resilience. This approach is set out in a recent UNEP report *“addressing loss and damage requires a range of approaches from those aimed at minimizing the impacts of climate change to those focused on helping human societies address and build resilience to the residual impacts of climate change using tools such as insurance and social protection measures”*⁴⁵.

The implications of including insurance as part of the disaster risk management financial system is that there is a need to develop partnerships between government and private sector financial institutions so as to ensure that the different aspects of financial management are included. Insurance, to be successful, requires an enabling environment that is part of a comprehensive risk management framework that includes risk assessment, early warning, risk reduction, risk transfer and rehabilitation⁴⁶.

Within the range of financial mechanisms, insurance is generally seen as particularly appropriate for low frequency, high impact events such as major storms or catastrophic floods which have historically happened only infrequently but which leave people and institutions needing access to substantial financial resources beyond those normally available to them if they are to recover.

The corollary of the point concerning high impact low frequency events is that insurance is unlikely to be appropriate for situations where risks are more predictable, especially where the impacts occur gradually, for example the issue of salinization which is increasingly affecting many coastal and deltaic areas: *“Insurance is used to address impacts associated with extreme weather events but is not generally feasible for slowly developing and foreseeable events or processes that happen with high certainty under different climate change scenarios”*⁴⁷

⁴⁵UNEP (2016) Loss and Damage: The role of Ecosystem Services United Nations Environment Programme, Nairobi, Kenya, page 43.

⁴⁶UNEP (2016) op cit.

⁴⁷IPCC, 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change

Insurance coverage can be provided at two levels: to individual households or enterprises such as shops and small factories to cover their individual risks, and at a higher, institutional level such as city or provincial governments where insurance is part of their overall financial risk management systems. Whilst the individual household or enterprise level is the form of insurance most familiar to many people, there are few examples of comprehensive systems in disaster-prone

areas of low or middle income countries, including Vietnam where such a system is yet to be developed on even a pilot basis. It is not affordable for many people and the risk assessment systems are not yet developed to an individual household or enterprise level. It is suggested that, as the policy landscape for addressing climate change evolves, three actions will help insurance contribute effectively to managing adverse effects of climate change⁴⁸:

- *Realizing technical and institutional advances that enable diversification and sharing of risks from extreme weather events.*
- *Lowering the costs of managing these risks.*
- *Ensuring more timely and targeted delivery of support when extreme events strike.*

Developing these conditions will take time and, in the interim, the level where insurance is most likely to be effective in Vietnam is at the city or provincial government level, where the increasing incidence and severity of disasters is placing an unsustainable burden on their finances that are not covered by normal budget allocations. When assessed at this level, the OECD⁴⁹ suggest that insurance has a dual role with respect to adaptation: "Access to insurance payouts can lessen the net adverse impact of climatic events on policy holders. At the same time, insurance is also an instrument for incentivizing adaptations aimed at reducing climate risks. Properly set insurance premiums can, in principle, send appropriate signals to policy holders to undertake adaptation measures to reduce exposure to various risks, including those posed by climate change" (page 5). This places insurance at the city or province level firmly as part of the overall adaptation, resilience and financial management system for the area under the jurisdiction of the agency taking out the insurance. This approach was discussed at a workshop between the Ministry of Finance and the World Bank held in Hanoi on 15th November 2016, where the need for a financial protection strategy was discussed and the potential benefits of integrating insurance into such an approach was agreed, with the conclusion that this provides the insurance, reinsurance, and capital markets with a real opportunity to expand their presence and tap into new regions, while also doing good for society and improving both the pre-event preparedness and post-event recovery capabilities of vulnerable economies around the world.



Mr. Pham Hong Ha, Minister of Construction discussed with the Committee of Economics - National Assembly of Vietnam about the Urban Development Management Law

⁴⁸ UNEP (2016) op cit.

⁴⁹ OECD (2008) Economic Aspects of Adaptation to Climate Change: Costs, Benefits and Policy Instruments OECD, Paris.

A recent study by the Asian Development Bank⁵⁰ is the most complete example for Vietnam of an attempt to develop a disaster risk financing (DRF) system for urban areas, with case studies of Can Tho and Hue which were designed to provide evidence for the replication of such a system in urban areas across the country. The study notes that *“DRF is based on the premise that anticipating and planning for the financial consequences of natural hazards will place government—both national and local—in a stronger, more resilient, and more predictable position, supporting timely post disaster relief, early recovery, and reconstruction efforts”* (page 1) but goes on to state that the financial management of disaster risk in Vietnam is *“in its infancy”*.

A series of consultations and analyses considered different aspects of DRF, identifying options considered suitable for the two cities. It was concluded that simple and transparent insurance solutions that were tailored to the primary disaster hazard each city faced (typhoons for Hue and floods for Can Tho) could be a practical, affordable and effective complement to the existing DRF system in the cities.

The study recommended “parametric insurance products”, where the claim is based on the occurrence and severity of the hazard event rather than the assessment of damage caused. The benefits of this approach were seen as simple claim procedures, quick payments and complete flexibility on how the payments are spent. The potential of this approach was agreed but the cities also expressed a need for clarity on the legal and regulatory environment within which they operate before it was felt that such a system could be fully implemented.



Delegation of SECO and GIZ meet with Ca Mau Provincial People's Committee and the Working Group



Da Nang City

This can be seen as an important, general conclusion on the role of insurance in building resilience and the development of DRF systems. The potential exists, particularly at the city and provincial level, but there is a need for institutional strengthening and, in particular, for the development of the policy and regulatory system that governs the financial transactions of municipal and provincial governments so as to ensure such insurance solutions can be integrated into their overall financial management systems. There is a strong case for further activities to explore the potential of insurance but Vietnam is not yet in a position where the effectiveness and sustainability of such systems have been conclusively demonstrated.

⁵⁰ADB (2015) Strengthening Disaster Risk Financing in Vietnam ADB, Manila.

3.4 Coastal Area Development

Many Metropolitan Regions are located on or close to the coast, including in Vietnam HCMC, Da Nang, Hue and a number of other major urban areas. Coasts are particularly vulnerable to climate change impacts and climate-related hazards and are also, in many cases, areas of rapid development, environmental degradation and land-use change. The vulnerability of Vietnam's 3260 km long coastline to climate change impacts is particularly severe because of the combined effects of sea level rise and the probable increased frequency and intensity of typhoons and major storms. Environmental and development trends such as the loss of mangrove forests (which protect coastal areas from storm damage) and the tendency to construct new developments in increasingly exposed locations exacerbate these risks. As Vu Canh Toan⁵¹ put it: *"Over the last few decades, coastal cities and provinces have experienced a high economic growth rate, which has contributed significantly to improve the local economies and the quality of life of coastal communities. At the same time, this has put huge pressure on coastal areas, which has resulted in environmental degradation, loss of coastal biodiversity and destruction of coastal habitats as well as in the depletion of coastal resources"*.

A Mangroves for the Future paper⁵² noted a number of initiatives, many of which are discussed below, to develop integrated coastal management in Vietnam but suggested that there are a number challenges to the development of an effective integrated approach for coastal areas:

- *The limited and contradictory understanding of what ICM is, reflecting the different approaches taken by initiatives over the last two decades.*
- *The lack of effective institutional arrangements and inter-sectoral coordination at both central and local levels.*
- *No sustainable financing for ICM implementation, with most activities to date dependent on government or, in particular, international development partners.*
- *Inadequate ICM materials and guidelines on what are effective ICM activities.*
- *The lack of a clear policy and regulatory framework for integrated coastal development.*



⁵¹ Vu Canh Toan (2012) Role of ODA in Promoting Integrated Coastal Zone Management in Vietnam, the Case of Thua Thien Hue Province report on the VNICZM project supported by the Netherlands Ministry of Foreign Affairs.

⁵² Nguyen Chu Hoi and Bui Thi Thu Hien (2014) Integrated Spatial Planning and Management for Marine and Coastal Sustainability in Viet Nam. Gland, Switzerland: IUCN, 13pp.



Da Nang City

In relation to the last point, in 2006 MoNRE published Vietnam's ICZM Strategy 2020 and Orientation up to 2030, with the intention that it would provide a framework to guide future coastal development activities. The approach set out in the Strategy on Integrated Coastal level, with the following medium and long-term objectives and aims:

- **The overall 2020 objective:** to implement the Vietnam ICZM Strategy 2020, to reach out to all coastal provinces, by creating sustainable inter-sectoral, interagency and inter-governmental coordination and cooperation mechanisms, working together in harmony with the stakeholders.
- **The 2030 aim is to** develop and manage the coastal zone of Vietnam in a sustainable way through integrated coastal zone management, to preserve its role as an equitable source for peoples' livelihood, safety and economic prosperity for all present and future generations.

The intentions of this strategy are undoubtedly good in intention and can still be regarded as valid but the absence of a policy and regulatory environment, of clear administrative procedures or institutional mandates and of clear budget and financial underpinnings for the implementation of any activities under this strategy severely limited its effectiveness.

A recent paper⁵³ has argued that the lack of an effective regulatory environment and poor understanding of future environmental impacts are increasing risks in many coastal areas of Vietnam, with the problems exacerbated by poorly-planned tourism, infrastructure and other development investments. There are a number of recent and on-going initiatives whose goals are to overcome these challenges, working at province or sub-province levels to build more integrated and coherent approaches to coastal development in areas that are considered highly vulnerable to increased future risks. One of the most substantial of these, the ICMP/CCCEP program (below) is working on a number of aspects of building more effective planning and management structures for coastal development at both provincial and national levels with activities in five provinces in the Mekong Delta.

A Metropolitan Region approach is particularly appropriate for cities located on the coast, in part because development pressures tend to extend beyond city boundaries along the coast and in part because actions to address the increased risks from climate-related hazards and climate change will often need the involvement of areas beyond the municipal administrative area. An early example of where this approach has been developed is the City of Hue in central Vietnam. The Vietnam – Netherlands Integrated Coastal Zone Management (VNICZM) Project, which started in the year 2000, was an early attempt to develop an integrated approach to coastal development, covering Hue City and three surrounding provinces (Nam Dinh, Ba Ria Vung Tau and Thua Thien Hue provinces) and including the globally significant ecological area of Tam Giang – Cau Ha Lagoon. It established a national and three provincial CZM strategies and action plans, supported the collection and analysis of data on coastal vulnerabilities, helped to build institutional capacities and awareness raising for coastal management and to identify different options for improving coastal management and protecting the ecosystems of the project areas, including a pilot study on sustainable

Sustainable Coastal Development in the Mekong Delta

Integrated Coastal Management Programme in Mekong Province for the adaptation to climate change (ICMP)/ Climate change and coastal ecosystems program (CCCEP) is a project jointly supported by the German and Australian Governments and is implemented by MARD and the PPCs of 5 provinces in the Mekong Delta. The program builds on earlier initiatives and aims to manage coastal ecosystems to strengthen the resilience and reduce vulnerabilities of coastal communities to the impacts of climate change. The program works with provinces to establish administrative systems to plan and manage coastal areas, working on six main areas of action:

- The integration of policies for coastal ecosystem management across departments and between national and provincial bodies
- Integration of climate change adaptation into development planning
- Planning and management of coastal ecosystems
- Biodiversity conservation
- Environmental education and awareness raising
- Identifying and Promotion of alternative income opportunities
- Coastal and river protection and ecosystems rehabilitation

Results to date have seen the protection of 320 ha of mangroves, the maintenance of environmentally-friendly coastal protection structures, the rehabilitation of floodplains, reduction of chemical inputs into agriculture, increased household incomes, the reversal of erosion to achieve increased sedimentation and the reduction of vulnerabilities to natural disasters of over 31,000 people.

⁵³Takagi, H. et al (2013) Coastal Risk Reduction in Vietnam: the Problems of Coastal Development and the need for Better Coastal Planning Background paper for the Global Risk Assessment Report, UNISDR, Geneva.

management of the lagoon. The VNICZM represents an important step in the development of integrated regional approaches in coastal areas of particular vulnerability but it worked within the existing administrative system, at provincial and national level. It did not develop a fully Metropolitan Region approach where the coordination of activities between provinces around Hue City was an outcome.

A similar approach but operating at the district level has been developed by IUCN in three coastal districts of Ben Tre Province⁵⁴, an area extensively used for aquaculture and agriculture and experiencing extensive loss of mangrove forests and severe erosion and environmental degradation. Earlier efforts at mangrove restoration had been largely unsuccessful and the IUCN Mangroves for the Future program undertook studies and consultations on the development of more effective district-level strategies for environmental protection and restoration that were aimed at reducing the vulnerability of coastal communities to natural hazards and environmental degradation. The program has identified a series of land and ecosystem management options that would constitute components of district level coastal management strategies for the study areas. These included land management, financial support for families at risk, engineering solutions, awareness and education activities and biological engineering such as forest restoration and biological fencing to reduce erosion.

Representatives from MoC, PPCs and DoCs of An Giang, Ca Mau and Kien Giang discussed “sand engine” with the Technical University of Delft, the Netherlands, 2018



⁵⁴Nguyen Tan Phong (2015). Towards sustainable coastal management and development in three coastal Districts of Ben Tre Province (Binh Dai, Ba Tri and Thanh Phu). Gland, Switzerland: IUCN, 52pp.

An approach to coastal development focused on the opportunities created by a major economic development sector has been undertaken in Da Nang city and its surrounding region by the PEMSEA program⁵⁵. The program recognized that tourism in and around Da Nang (especially in the coastal strip to Hoi An) is a major development sector with significant economic potentials but is one that will create significant development pressures that can result in environmental degradation along the coast and is also highly vulnerable to the impacts of climate change and extreme weather events. Developing this sector within an ICM context that includes the city and the surrounding Metropolitan Region. Building on the earlier Da Nang city ICZM plan, a range of activities were developed that were intended to support and control tourism development in the region, including the following components:

- Coastal land use zoning to ensure the carrying capacity of coastal areas is not exceeded and designated areas of ecological significance are protected.
- Legislation to control the exploitation of coastal and marine resources, focused on fisheries and on other aspects of resource use.
- Public education and awareness raising campaigns.
- Support to the resettlement of coastal communities displaced by development pressures such as luxury tourism developments.
- The rehabilitation of coastal areas to support tourism whilst maintaining environmental quality.
- Improvement of living standards in coastal communities.

The results of these activities have been a more sustainable form of tourism development, increasing economic development and city revenues, providing new and improved livelihood opportunities for local people and reducing the human and environmental risks that unsustainable development would bring. The Da Nang example demonstrates how an integrated approach can start with one major development sector. The challenge for the future will be to evolve this into a more complete, integrated approach for the development of the Dan Nang Metropolitan Region.

There are a number of initiatives being developed at the time of writing that will seek to develop this more integrated approach to the development of Metropolitan Regions in coastal areas of Vietnam. One such initiative, being prepared in 2017 is from the Green Climate Fund and involving UNDP and a number of GoV agencies, is the "Improving the Resilience of Vulnerable Coastal Communities to Climate Change and Related Impacts in Vietnam", scheduled to run for the 2017-2022



period. The documentation available suggests that the objective of the project is to improve the resilience of vulnerable coastal communities to climate change related impacts in Viet Nam through: safe housing to protect vulnerable communities from increased flooding and storms; robust mangrove coverage to provide a natural buffer between coastal communities and the sea; and enhanced climate risk information to guide climate resilient and risk informed planning. The project will scale-up and integrates existing government efforts proven to increase the resilience of vulnerable coastal communities in Viet Nam. The program will seek to benefit

⁵⁵ PEMSEA (undated) ICM Solutions: Coastal Tourism in Da Nang, Vietnam a digest of contributions to an ICM case study publication under preparation by PEMSEA



The visit of the Swiss Ambassador to the FPP Office in Can Tho, January, 2018

all 28 coastal provinces, with more focused investment planned in Hue, Thanh Hoa, Quang Nam, Ca Mau, Quang Binh, Quang Ngai and Nam Dinh provinces.

There are consequently a number of recent and on-going activities to establish integrated approaches to the development of coastal Metropolitan Regions, a number of which have notable achievements in the localities in which they have been implemented. There has also been a national strategy for more than a decade that is intended to initiate integrated coastal zone management approaches throughout the country. The need for such integrated approaches to the complex and multiple vulnerabilities and development opportunities is widely accepted. The extent to which these individual initiatives have been replicated beyond their locations or program

times has been extremely limited however, a clear reflection of the lack of an effective policy and regulatory environment, uncertainties over institutional responsibilities, procedures and mandates and the very limited access to financial resources to support the wider development of such approaches. Establishing the policies, regulations, institutional framework and financing for integrated approaches to resilience and coastal development is a clear challenge for the future if the agreed needs for such approaches is to be satisfied.



Water Level Depth gauge board in Ca Mau City

3.5 Vulnerability and Resilience Indicators and Mapping

3.5.1 Introduction

One of the key challenges in the establishment of resilient and effective planning and financial management systems within Metropolitan Regions (and indeed at all levels of society) is to ensure that these systems have the right information upon which to make the decisions needed to ensure the cities and their surrounding regions are able to function and grow without disruption from unforeseen events such as natural disasters. The reality of the future, and the basis of the need to build resilience, is that cities and their surrounding regions will be faced with greater uncertainty and less stability of key conditions. Climates and ecosystems are changing, and so are economies and societies, and all are changing at rates that have few precedents in human history. Good decisions in this context of increasing uncertainty will rely on good information available at the right time for decision makers. This section discusses two types of such information that are of particular relevance and interest for Vietnam: resilience indicators and mapping of hazard risks, vulnerability and resilience.

Topographic Survey in Ca Mau City



3.5.2 Indicators

The availability of clear and practical indicators for the governments of cities and provinces is important in allowing them to both understand how they are managing the changes needed to strengthen resilience and predict the future challenges, the sudden shocks and adverse trends, which could potentially disrupt their progress. This is recognized in the Draft Law on Urban Development (draft of 17th November 2017), with Article 20 stating that “the government must issue indicators, standards, construction standards for resilient cities to adapt to climate change, green growth and smart city development. Indicators are consequently seen, in the draft law, as a key part of the knowledge and management system needed to enhance urban resilience.

A recent UNISDR publication⁵⁶ noted that this is something that the governments are aware of: “Local governments have expressed the need to benchmark their urban resilience efforts with clear quantitative indicators. This type of indicator will

⁵⁶UNISDR (2012) My City is Getting Ready! A global snapshot of how local governments reduce disaster risk UNISDR, Geneva, page 67.

help local decision-makers prioritize resilience activities and understand the value of their investments in these areas". For these governments, to be useful the indicators must be available at the right time on a reliable basis, must be understandable by the officials and decision makers in the local governments and must not be too expensive or require technical capabilities that they are unlikely to have.

These qualifications on the practical availability and affordability of indicators is important if they are intended to be used in decisions on strengthening resilience. There is a great deal of discussion internationally about resilience indicators, including many that are specifically focused on urban areas. These indicators need to cover a wide range of issues and to be able to give insights into the interactions between these issues. For a comprehensive set of resilience indicators, the issues

that should be covered include⁵⁷:

- Economic well-being and stability (e.g. standard of living; rate of urbanization).
- Social and demographic characteristics of the population.
- Institutional stability (e.g. institutional 'memory'; corruption).
- Strength of and reliance on public infrastructure (e.g. health expenditure; communication, infrastructure; financial, transport, corporate and systems; degree of centralization).
- Global interconnectivity (e.g. trade balance; tourism).
- Natural resource dependence and regenerative ability of ecosystems.



Figure 10: OECD Framework for Measuring Urban Resilience

⁵⁷ Tanner, T. et al (2009) Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities IDS Working Paper 315, University of Sussex, UK.

The OECD⁵⁸ identifies a similar range of issues for the measurement of resilience, presenting them diagrammatically (See Figure ---). This is a useful starting point and most of the measures identified in the diagram are ones that would generally be available to local governments but it is somewhat general and in particular does not relate to specific sources of increased risks and vulnerability, especially in relation to climate change and natural disasters.

A more specific focus on issues of climate and disaster-related risk and vulnerability is presented in a recent World Bank publication⁵⁹, which notes that

“risk information provides the basis for prioritizing risk reduction measures. Indicators and visualization tools can highlight trade-offs between various policy options and guide investment and development decisions”. The report goes on to suggest that methods such as there are a wide range of approaches that can contribute to understanding and building urban resilience, including risk assessment, risk-based land use planning, urban ecosystems management, urban upgrading, community and stakeholder participation, DRM, data gathering, analysis and application, risk financing and transfer approaches. The report identifies disaster resilience indicators in five groups:

- *Social resilience, including factors such as age, education, access to transport and communications, health coverage and others.*
- *Economic resilience, including housing capital, income and equality, different aspects of employment and the size of businesses.*
- *Institutional resilience, including municipal services, political fragmentation, previous disaster experience, social connectivity and other factors.*
- *Infrastructure resilience, including the characteristics of housing, shelters, medical services and others.*
- *Community capital, including social, political and religious engagement, place identification and civic involvement.*



Dr. Jasper Abramowski - Country Director of GIZ Vietnam visits the Ministry of Construction

⁵⁸ OECD (2017) OECD website report on OECD Resilient Cities Project OECD Paris.

⁵⁹ Jha, A. & Brecht, H. (2013) Building Urban Resilience in Asia World Bank, Washington D.C.

The specific issues identified here, as in many other reports, are somewhat vague and generic but the five-fold indicators categorization is extremely useful and the report does stress the need to identify specific sets of indicators that reflect the particular characteristics of the place, for our purposes the metropolitan region, being managed and the risks and vulnerabilities that affect it.

In developing indicators for any particular place and purpose, it is important to find a balance between, in the one hand, the comprehensiveness and conceptual rigour of the methodology uses and, on the other hand, the practicality of the approach given the resources, information and capabilities that are available to city and provincial governments. Finding the right balance is a key challenge. There are a number of internationally recognized approaches that are rigorous and comprehensive but that would be extremely challenging for any local government to apply.

For example, UNISDR⁶⁰ has recently advanced a framework of “new local-urban indicators of resilience” developed in collaboration with a number of partner agencies. The indicators are intended for use by local authorities and follow a logical sequence of scoring on indicators and sub-indicators as a means to identify gaps that need to be addressed and specific actions to address the gaps. What is problematic is that the framework contains four stages that move sequentially from 8 indicators to 30 indicators to 107 indicators to, in the final stage, 229 indicators. Although the details of the indicators are not clear, the numbers involved are likely to be extremely challenging for any local authority to collect, yet alone analyse and update on a regular basis.

The City Resilience Index⁶¹ developed by ARUP for the Rockefeller Foundation combines qualitative and quantitative measures through a sequence of steps to identify 52 indicators of urban resilience. These 52 indicators are in 12 groups related to specific goals for the development of resilience, including issues such as diverse livelihoods and employment, reduced exposure and fragility, effective provision of critical services and the empowerment of stakeholders. Each of these goals has between three and five indicators linked to it. The goals in turn relate to the “four key dimensions” of a resilient city: **(i)** health and well-being; **(ii)** economy and society; **(iii)** infrastructure and environment; and **(iv)** leadership and strategy.

This approach has many strengths and does assist in the development of a clearer and more comprehensive understanding of what the development of resilience means. It provides a valuable framework to bring stakeholders together to discuss the meaning of resilience and the areas in which actions are needed to strengthen resilience. The main reservation on the approach is that the number of indicators, 52, is high and, further, that many would need information that is not likely to be readily available to local governments. Moreover, some of the indicators are extremely subjective in character: for example, one indicator is “sufficient and affordable food supplies for all”, which could in principle be measured through a comprehensive nutrition study but this is likely to be beyond the means of any local authority and would in any case only provide a ‘snapshot’ of one point in time. A characteristic of good indicators is that they can be regularly updated so that progress (or otherwise) can be monitored.



SECO and GIZ Delegation joining the site visit on coastal flooding in Ca Mau

⁶⁰ UNISDR (2017) Draft: New Local-Urban Indicators DDR and Resilience UNISDR website November 2017.

⁶¹ ARUP (2015) The City Resilience Index ARUP. London.

A recent comparison of different resilience measurement frameworks⁶² examined 17 sets of indicators of resilience from internationally recognized resilience frameworks. The findings are interesting, not least because the paper concludes that comparisons are difficult because different indicator sets are based on different conceptual frameworks on the meaning of resilience and the functionality of indicators. The report also concluded that there is a gap between the generally accepted meaning of resilience and the focus on well-being and general development factors in many frameworks, and that many of the indicator sets only give a partial picture on the satisfaction regarding resilience. The paper also concludes that the number of indicators in many frameworks can affect their usability:

“The key to good indicators is credibility rather than volume of data or precision of measurement...large volumes of data can confuse rather than bring focus. It is more helpful to have approximate answers to a few important questions than to have exact answers to many unimportant questions” (page 12).

This is an important and insightful observation. It can be taken as a point of departure for the approach to the development of indicators of resilience that is currently being initiated by the GIZ Mekong Urban Flood Proofing and Drainage Programme⁶³ that is the context within which this report has been prepared. One of the activities that has been initiated by this programme is to define, working closely with the Ministry of Construction, city and provincial governments and other stakeholders, that were based on the following characteristics:



Delegation of the Office of the Government and GIZ meet with Can Tho City Party's Committee and People's Committee on Regional Coordination in Mekong Delta

- They should be seen as useful and credible by city and provincial decision makers in Vietnam who are aiming to strengthen the resilience in the areas under their jurisdiction.
- The information on which the indicators are based should be collectable and can be updated on a regular basis within the resources and capabilities available to these local governments.
- To achieve these first two points, the indicators should be based on information that is already regularly collected by the Vietnamese government, with where possible a clear link established between the data and the regulations on which it is collected (to ensure its credibility).

⁶² Schipper, L. & Langston, L. (2015) A Comparative Overview of Resilience Measurement Frameworks ODI Working Paper 422, ODI London.

⁶³ GIZ (2017) Development of Practical Water-Related Resilience Indicators for Vietnam Urban Centres and its Implementation Road Map GIZ/MoC Wastewater Management and Solid Waste Management Program, Vietnam



The first step in the process was to define the scope of the indicators, the issues within the broad field of resilience that the indicators would cover. The agreed focus reflected the scope of the programme as a whole, emphasizing issues related to water resources and related infrastructure, the wider environment and the ability to cope with and recover from disasters. It was agreed that indicators related to health and well-being and to economic and social development would be developed at a later date based on the lessons learnt from this exercise.

Within this scope, the next step was to prepare an inventory of existing statistics that are collected on a regular basis, with those identified ones that were required to be collected under specific government regulations. This included a wide range of Laws, Decrees and Decisions that specify the responsibilities of different agencies to regularly collect data that is available to local and central government organizations and can be used in their planning activities. All are ones that are collected on a regular, generally annual, basis and all are ones that are quantitative measures or specific actions (such as undertaking an administrative or planning task) that can be independently verified. A total of 29 such measures were identified, grouped together under five headings that reflect specific functions into urban resilience related to water resources:

- Policy and institutional aspects, which includes 10 measures related to the extent to which municipal governments have incorporated into their planning and administrative systems specific actions defined in national policies and regulations. Examples of these measures include (i) whether the authority has incorporated climate change adaptation and green growth strategies into the provincial master plan; and (ii) applying an incentive mechanism in policy for increasing the participation of private and other stakeholders in water investment and O&M.
- Sustainable water supply, including measures such as (i) increasing the rate of safe water supply, with target of 2% increasing per year; and (ii) reduction of water loss to 15% (2025).
- Sustainable drainage and flood management, including (i) building flood hazard map, flood risk assessment, flood protection plan and reserving water buffer zones for each city; and (ii) prioritize investment in the development of drainage systems in most vulnerable areas.
- Sustainable wastewater management, including (i) Increasing rate of wastewater collection (household connection) and wastewater treatment, with a target of 5% increasing per year; and (ii) Promoting application of new, clean and environmental friendly technologies in water and wastewater treatment.
- Sustainable energy for green and smart cities, including measures such as (i) Increase the Application of solar energy and other regeneration energy for environmental protection for sustainable and green cities; and (ii) Increase the rate of Construction of built-back-better natural disaster – resistant works towards energy saving and sustainable development

This approach is, at the time of writing, still under development. It is anticipated that the approach will be developed to identify a limited (less than 10) set of compound indicators that aggregate the identified measures to provide decision makers insights into key issues related to building greater resilience in cities and provinces. These compound indicators will be based, as has been said, on measures that are already collected on a regular basis so their analysis will not entail significant costs in data acquisition and the indicators can be regularly updated. The process of their analysis and discussion will achieve what good indicators should do: they will provide insights into trends in specific areas of concern and they will stimulate a wider awareness of resilience as an approach to guide urban and provincial development.

3.5.3 Suitability Maps – a New Tool for Risk Sensitive Urban Planning

In many places urban planning does not adequately consider natural hazards and their potential impact on physical structures like residential settlements, shops and stores, factories or infrastructure. In some case this might be due to negligence but more often than not planners do not find detailed, meaningful maps displaying how dangerous different places are. Many hazard maps use categories like “low, medium, high” hazard, leaving the planner wondering whether frequency and intensity of the hazard are beyond an acceptable level or constitute a minor danger which could be ignored.

This becomes more complicated if many hazards affect the same location, which is a typical situation in most parts of Vietnam. Many cities are located in typhoon prone areas or along rivers capable of causing floods. Most cities are also in harm’s way for rain induced floods, often aggravated by poor drainage systems. Some coastal cities may be subject to storm surges or tsunamis from the Manila Trench and Hanoi lies in an earthquake zone. Cities with steep mountains (e.g. along the coast in the center of the country) face the additional threat of landslides. It is difficult to estimate the composite threat caused by all these hazards. The impact of them on

buildings varies considerably. Floods start causing damages from the bottom while high winds may attack a roof first. Different types of buildings are differently sensitive to various hazards. What matters is not only the intensity of a hazard and the respective vulnerability of an asset in harm’s way but also the expected frequency of hazardous events happening. Typically less severe events are more frequent than rare high impact events.

How does an urban planner bring all this together to estimate how dangerous different places are? In economic terms the common denominator of all mentioned aspects is the value of expected damages over time. Damages of very different characteristics and different probabilities all have in common that they cause damages quantifiable in monetary terms. This might be expressed in Vietnamese Dong (if a certain building value is assumed) or in percent of the building value. The reference



Delegation of the Office of the Government and GIZ meet with Soc Trang Province Party's Committee and People's Committee on Regional Coordination in Mekong Delta

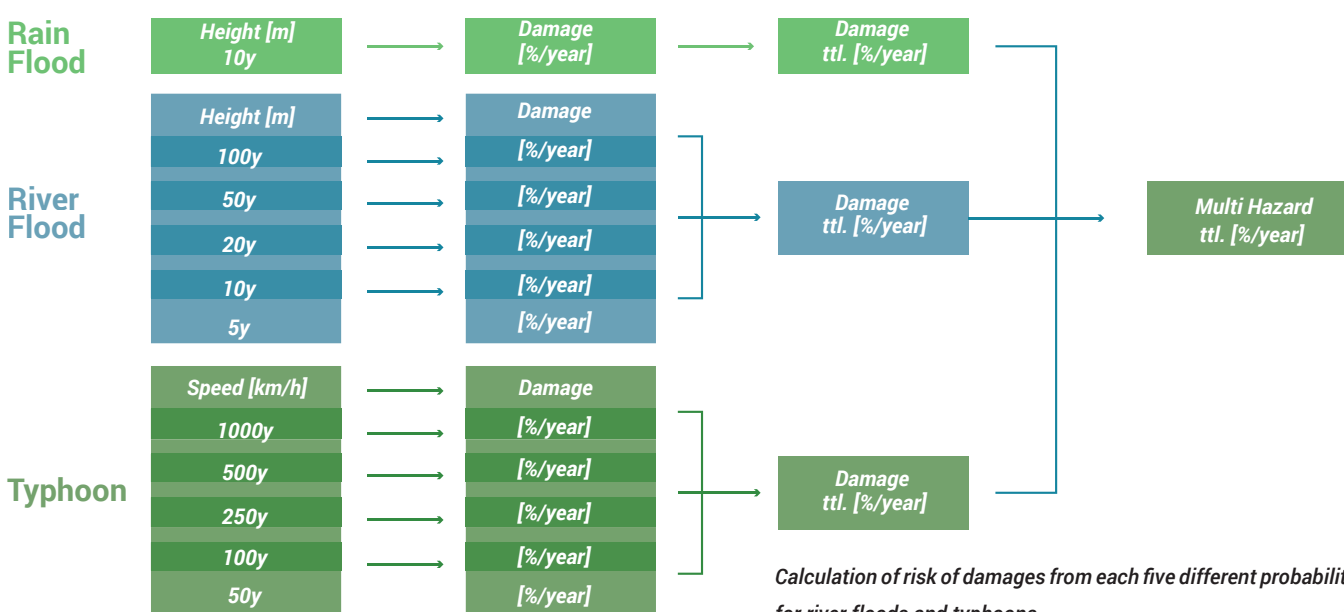
period for such figures is normally a year. The typical added values of damages from multiple hazards and probabilities range from 0 to 5% loss per year. 5% means that statistically it is expected that the value of the complete building will be lost within a period of 20 years. Normally this is regarded to be unacceptably high. However, such value indicates which locations are suitable for buildings and which are not, hence, this map is called building suitability map.

GIZ developed the model to calculate the combined expected damages from multiple hazards in the Philippines and is applying it now in three cities in Vietnam, Rach Gia, Long Xuyen and Ca Mau. The model considers all hazards relevant in an area. Therefore the first step in producing a suitability map is the selection of high impact hazards. For example, for the city of Long Xuyen in the Mekong delta two types of floods are of interest, pluvial (rain induced) and fluvial (river induced) floods. Furthermore, the area is occasionally hit by tropical cyclones.

The hazards are divided into five different categories of probabilities or return periods (e.g. 5, 10, 25, 50, 100 years for floods and 50, 100, 250, 500, 1000 years for storms) and for each of them the maximum hazard intensity is calculated derived from statistics based on historical records. These might be locally collected data or they could originate from national or even global data sources. Quite often this information is not readily available and some assumptions have to substitute actual observations.

Some hazards are subject to change over longer periods of time. This applies especially to weather related hazards as they might be influenced by climate change. The integration of such anticipated changes requires two decisions. The first has to determine the point in time the final map shall reflect. It might be the middle or the end of the twenty first century or any other selected date. The second decision is the selection of a model regarded to be a realistic scenario for future developments. This is particular challenging for climate change models as different models may show contradicting predictions for future rain and storm patterns. Other human activities like regulating the discharge of a river with dams and dikes influence flooding and have to be considered as well.

Vulnerability curves describe the impact of different hazard intensities on buildings. Such curves have been generated from damage observations during actual disasters and from tests by engineers. Many of these data are not yet localized to the Vietnamese context yet and therefore curves coming from other countries are used.



Hazard data and vulnerabilities are multiplied to result in the risk of damages expressed in expected losses for each hazard and return period. In a final step these risks are added to arrive at a composite value indicating the combined risks in an area. The calculations are done with Geographic Information System (GIS) software. Graph AAA shows an example of the GIS process.

This type of suitability map was used in many municipalities in the Philippines by land use planners and it is expected that this will help urban planners in Vietnam as well. Apart from the application in urban planning the private sector may utilize the suitability information. Investors are interested in natural hazards threatening a location for a new factory and insurance companies might use such information to determine premiums for buildings.

Some of the utilized data sources may be updated when new data are available. This applies in particular

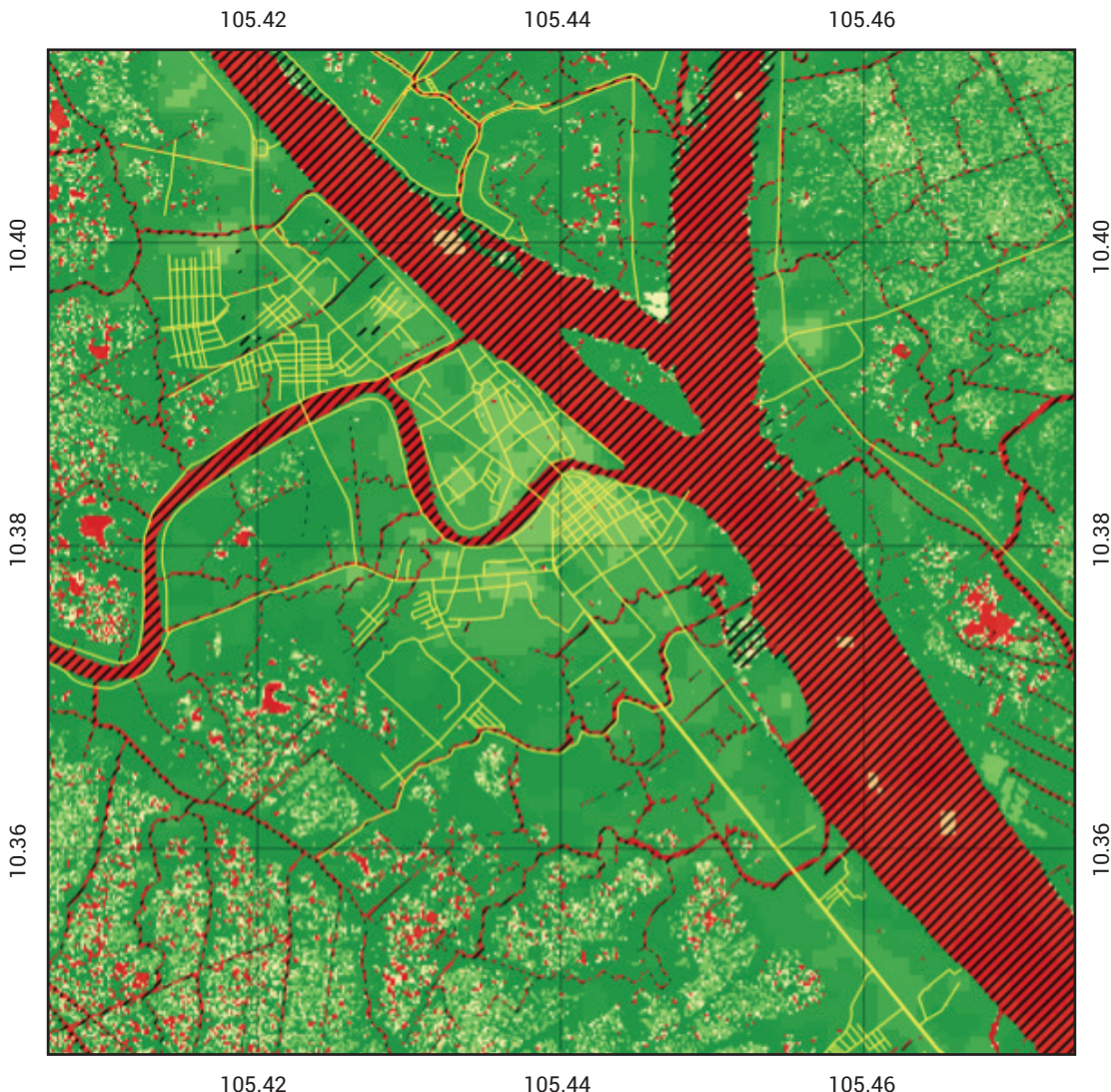
to a Digital Terrain Model, data on ground subsidence and climate change predictions. However, it is not expected that newer data will substantially change the calculated damages as the method is not very sensitive to small changes.

For Long Xuyen, Rach Gia and Ca Mau it might be valuable to apply the suitability mapping method to other structures apart from simple, residential buildings. The physical susceptibility to floods or other hazards of other structures is different from residential buildings and therefore that vulnerability has to be factored in while hazards remain the same. Apart from applications in urban context the suitability model may also benefit agriculture if the specific vulnerabilities of crops are considered.



Two staff of the City of Hamburg are opening a storage compartment for flood barriers

**MULTI HAZARD SUITABILITY MAP FOR RESIDENTIAL BUILDINGS
LONG XUYEN, AN GIANG, VIETNAM**

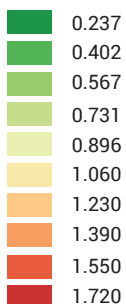


Legend

— Roads (source: Open Street Map)

/// Waterways

Annual expected damage in percent



Sources: Wind speeds calculated based on data from CAPRA (Probabilistic Risk Assessment), floods based on return periods of river levels and flood height observations. Calculations and map layout by Olaf Neussner, GIZ.

Projection: WGS84
Scale: 1:40,000

November 2017



The discussion in the preceding chapters set out the need for and potential actions to build towards strengthening resilience in the planning and administration of Metropolitan Regions in Vietnam. There is a clear government trend to establish regional development across the country whilst at the same time recognizing that each region has its own challenges. The recognition of the need for this approach by the government is reflected in the publication of a recent document by the Prime Minister's Office: Resolution 120/NQ-CP on Sustainable and Climate-Resilient Development in the Mekong Delta of Viet Nam, which was signed on 17th November 2017. This resolution in turn reflects the outcomes of discussions amongst a wide range of stakeholders in the Conference on Sustainable and Climate Resilient Development of the Mekong Delta held on 26-27 September 2017. The establishment of new approaches to achieve climate-resilient development is consequently central to the government's thinking and the approach that is to be piloted in the Mekong Delta will, if successful, be assessed and adapted to the characteristics of other regions.

The Resolution is comprehensive in that it addresses a range of issues and defines key responsibilities for a wide range of agencies. One central premise is that climate change and sea level rise are irreversible and that long-established traditions of living with and adapting to floods in the Mekong Delta need to be at the centre of the development approach and extended to address new challenges such as salinization. The Resolution states that "Water resources should be the core factor and the basis for developing strategies and policies" (Article 3). The Resolution also states that a "Comprehensive and integrated approach to socio-economic development of the Mekong Delta, boost development connectivity and cooperation of intra region and between the Mekong Delta and Ho Chi Minh City, the South East provinces and other regions, between Viet Nam and other countries", a position that reflects well a Metropolitan Region perspective and the need to enhance cooperation within and between cities and provinces.



Da Nang City

In relation to urban resilience, the Resolution defines specific responsibilities for MoC, including to continue with and strengthen the “urban smart development programme”, ensuring that this approach develops in line with ecological principles and with specific measures to reduce hazard risks such as floods, typhoons and sea level rises. The Resolution also outlines measures for MoNRE and other agencies on data collection in relation to disasters and climate change and the establishment of early warning systems for natural disasters. The need for a “new cooperation framework” for water resources and climate change is identified in the Resolution and international development partners, including GIZ and SECO who finance the project under which this paper has been prepared, are well placed to engage in such cooperation.



Department of Construction of Ca Mau is explaining the construction plan of Ca Mau City to SECO and GIZ

The above details on what is, at the time of writing, a very new Resolution from the government have been set out because they reflect the development of thinking on issues related to resilience to climate change and natural disasters. The Resolution places resilience at the centre of the development approach for the Mekong Delta, an area which is both highly vulnerable and of key strategic importance in national economic development. The emphasis placed on enhancing cooperation at all levels, including within and between provinces, is particularly significant as it helps to define what are the first critical steps in ensuring that resilience moves beyond a nice idea to become a central tenet of development planning and management in vulnerable areas.

This approach is also in line with that of the **Draft Law on Urban Development Management** (9th February 2018). Although this law was still under development at the time of writing, the draft gives a clear indication of the direction in which urban development planning can be

expected to move in the future. Article 15 of the draft law is on the “main principles for Urban Resilient Cities to adapt to climate change, Green Growth Cities and SMART Cities”. This article specifies that urban resilience with climate change adaptation and mitigation, green growth and smart cities approaches must be integrated into the planning and administration of urban areas and their surrounding regions. It states that “resilient cities must be established in provinces that have impacts from natural disasters” which in practice is most of the country.

Article 16 of the draft law specifies mechanisms to encourage and provide incentives for the development of resilience and green growth approaches in urban planning and administration. These include incentives for private sector investments. The provisions of the draft law are consequently closely aligned to those of the Mekong Delta Resolution discussed above and, taken together, these two contemporary documents demonstrate that a resilience approach is central to national thinking on urban and provincial development and responses to natural hazards and climate change.



Representatives of MoC, PPCs and DoCs of An Giang, Ca Mau and Kien Giang discussing disaster risks management with GIZ at its Headquarter in Eschborn, Germany

The implications of the analysis presented throughout this report are clear: challenges associated with increased risks of natural disasters and climate change impacts will accelerate in the future in Vietnam and will be particularly severe in areas such as the Mekong Delta and coastal zones that are already highly vulnerable. Meeting these challenges will involve concerted action on a number of fronts, with this in turn necessitating higher levels of coherence and cooperation in the planning and actions of different administrative areas, especially provinces and cities. Greater levels of provincial cooperation and regional coordination will be the process through which such coherence will be achieved. Coherence between national and decentralized levels is also essential as many actions will depend upon a supportive policy and legislative environment.

The discussion of the different policies and legislation in this report demonstrate that different aspects of a

resilience approach are becoming increasingly the norm and are explicitly identified as the basis for future actions in recent measures such as the Resolution and Draft Law discussed in the opening paragraphs of this chapter. This is positive and exciting but there remains a need for a concerted effort to ensure greater coherence and cooperation between different sectors and agencies both within and between sovereign administrative areas such as provinces and cities. A key part of the process through which greater coherence, cooperation and, ultimately, coordination are created is the further development of the policy and regulatory framework. In particular, new legislation such as the Law on Planning (passed in November 2017) and the Law on Urban Development Management that is currently under development need to be followed by Decrees, Decisions and further regulatory mechanisms that are the means through which the intentions of the new laws will be turned into concrete implementation procedures.

Agreeing the future trajectory of change and aligning planning and administrative actions more closely will not happen overnight and needs to be phased in through practical, sequential measures that both demonstrate their immediate benefits and contribute to the wider process of building coherence and cooperation. A number of potential areas for cooperation and alignment have been discussed in chapter three but those discussed there are far from an exhaustive list and the most appropriate initial areas for action will vary from place to place throughout the country.

Part of the context for these changes is the continuing development of decentralization in Vietnam which became a central level priority following the Sixth Party Congress in 1986 which initiated the Doi Moi reform process. This has been a central policy objective for some time but obstacles to achieving full and effective decentralization remain and need to be addressed if the potential of a resilience approach is to be realized and present and future disaster and climate-related risks minimized. The move from traditional, sector-based central planning to cross-sector, decentralized planning has presented formidable challenges and can be regarded as still being a 'work in progress'. In part this is because of the complexity of the process: transferring planning, budgetary and administrative power to provinces whilst maintaining national order and stability and ensuring a level of coherence in national development approaches takes time and will progress at different rates in different areas.

There are a number of areas where more progress needs to be made if a fully effective system of decentralized planning and governance is to emerge. These include the need to strengthen planning systems at city and provincial levels as many still remain fragmented along sectoral lines and limited in their consideration of issues beyond those included in traditional central planning approaches. Master planning needs replacing or at least renovating to ensure that plans are evidence-based and provide strategic direction, vision, objectives and correct prioritisation of projects. Part of this is to expand the range of stakeholders involved in planning and management, in particular to include wider private sector and community representation in planning processes and the implementation of infrastructure

and other investments. Provinces need to retain more revenue and, where possible, generate more revenue through service user charges, so they can take control and responsibility for local budget allocation decisions and public project selection.

LAUNCHING CEREMONY OF THE BOOK CLIMATE CHANGE ADAPTATION IN VIETNAM



German Ambassador, Swiss Ambassador and leadership of the Committee on Science, Technology and Environment, National Assembly launched the Book "Climate Change Adaptation in Vietnam"

Despite these reservations, the decentralization process is largely irreversible and is the context within which the development of resilience approaches will be developed. This is reflected in recent policies and legislation such as the Law on the Organisation of Local Government and the Law on the Organisation of National Government which were approved by the National Assembly in 2015. These recent laws further strengthened the role of provincial and municipal authorities in key planning areas for resilience such as the planning, construction and operation of infrastructure such as water supply and flood control measures and the establishment and management of disaster early warning and response systems.

These responsibilities were consolidated in the Law on Planning, passed by the National Assembly in November 2017, which is in part a recognition of the need to improve the quality and effectiveness of planning at provincial and municipal levels. Measures to strengthen decentralized planning have been paralleled by the assignment of greater levels of financial responsibility and control to cities and provinces by measures such as the Decree No. 16/2016/ND-CP dated 16/03/2016 on management and use of official development assistance and concessional loans granted by foreign sponsors and Decree No. 52/2017/ND-CP dated 28/04/2017 on the Management of On-Lending of Official Development Assistance (ODA) loans and Government's

Concessional Loans to People's Committees of Provinces and Centrally-Run Cities.

The legal and policy framework for developing resilience-based approaches to planning and management at the provincial and municipal levels is consequently still under development but has been strengthened considerably in recent years. The overall direction of change is clearly towards decentralized administrations having greater authority, and taking greater responsibility, for future development directions. Meeting the multiple challenges of disaster management and climate change is consequently contingent upon cities and provinces building their capacity to respond to risks and uncertainty.

The process of change to strengthen decentralized planning and management will, as has been said, develop gradually and through different phases. Although the situation varies from city to city and province to province, the first step is to improve cooperation and coherence of decision-making within provinces and, in a Metropolitan Region context, between cities and the provinces in which they are located. Fragmented, sector-based master planning must evolve towards more effective alignment of key decisions within a resilience framework. This includes the recognition of the need to address both immediate and long-term risks resultant from increased incidence of extreme weather events and the wider impacts of climate change. Greater flexibility, the capacity to respond to the unexpected and to reflect ever-changing social, economic and environmental conditions, is something that needs to be developed in planning and management systems within provinces and cities. Improving the information available about these trends is essential if more evidence-based planning is to be developed and priorities for actions and investments are to be efficiently established.

The establishment of more coherent and aligned planning and management at city and provincial levels will create a basis for expanding cooperation between provinces and cities. This will be essential in many areas where challenges (including flood risks and climate change impacts) inherently cross administrative boundaries and where investments (such as water management infrastructure) and management (for example early warning systems) will benefit from economies of scale and flows of information between provinces. This is already happening in some areas, for example the coastal zone management experiences discussed above, and these initiatives need to continue and be built upon. The discussion in infrastructure and disaster risk insurance in the preceding chapter is a further area where the potential for active cooperation could be pivotal in its development.

The approach to developing inter-provincial cooperation is more likely to be successful if it is organic, gradually establishing cooperation in fields that are clearly defined and where tangible benefits are clear. This will build confidence and mutual understanding and will lay the foundation for more comprehensive cooperation as and where this is needed. This approach was recognized in the September 2017 Conference on Sustainable and Climate-Resilient Development in the Mekong Delta and was subsequently enshrined in Resolution 120, discussed above. The Resolution calls for the development of “an integrated plan for the sustainable and climate resilient development of the Mekong Delta”, with this building on existing examples of cooperation and coordination between the cities and provinces of the Delta.



Ha Noi City

Amongst these examples is an inter-provincial cooperation organization between four provinces: An Giang, Ben Tre, Can Tho and Dong Thap, that was established in May 2015 with an agreement to coordinate on plans and implement inter-provincial pilot activities on the development of agricultural value chains and product development. This agreement has been integrated into the Socio-Economic Development Plans of the four provinces. A further initiative to engender greater cooperation is Decision 593/QD-TT issued by the Prime Minister on the 6th April 2016 and its Action Plan presented in Decision 2220 issued on the 17th November 2016 outline the pilot for regional coordination in the Mekong Delta by developing inter-provincial projects and programmes as well as institutional development for the region.

The longer-term future will be to work towards more comprehensive planning and management systems across entire regions that will be the basis for effective cooperation and coordination between a significant number of cities and provinces. This cannot be masterminded from the top or introduced overnight, it needs to be built from the bottom but be supported by an enabling national policy and regulatory framework. This is, as we have seen, what is already happening. Support to this approach needs to be strengthened and specific areas for greater cooperation within and between provinces need to be identified and supported.

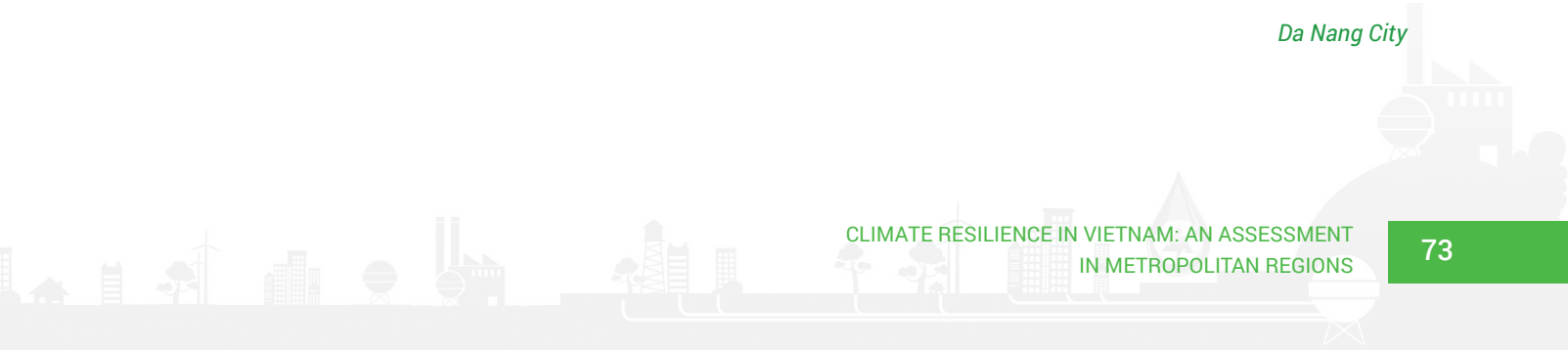
The combination of a recognition of the challenges stemming from natural disasters and climate change, the potential of resilience and green growth approaches as a basis for meeting these challenges and wider social, economic and policy changes point towards new planning and management approaches. The foundation of these approaches will be legislation and actions to build greater alignment and cooperation both within and between cities and provinces, with these eventually building to structured mechanisms for formal coordination in development planning, disaster risk management, infrastructure investments and other areas that will bring tangible benefits to the different participants. The challenges remaining to achieve this should not be underestimated but the trajectory of change is all in one direction and the intent of the recent laws and other policies and regulations from the government is clear.

Achieving these changes will benefit greatly from sustained support from international development partners and several are already active in a number of areas that will contribute to these changes. The prominence of cities in economic and demographic development and the ever-growing levels of interactions of all sorts with their surrounding areas makes Metropolitan Regions a natural basis through which these changes can be achieved.





Da Nang City



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