



Viet Nam is one of the countries most seriously affected by climate change. During the last decade, in parallel with the rapid economic growth, the Party, government, National Congress and society has given high priority to improving environmental sanitation, flood proofing and drainage for adaptation to climate change, especially in coastal cities and low-lying delta areas. The government has made significant investments in drainage and sewerage systems in coastal provinces in Vietnam, however, much more investment is required to meet needs in the provinces.

In this context, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Administration of Technical Infrastructure (ATI) - Ministry of Construction (MoC) of Vietnam carry out two programmes on urban resilience: the Wastewater Management Programme and the Programme "Flood Proofing and Drainage for Medium-sized Coastal Cities in Vietnam for Adaptation to Climate Change". They are both technical cooperation projects between the Vietnamese and German Governments funded by the Federal Ministry for Economic Cooperation and Development. The phase 2 of the FPP is co-financed by the State Secretariat for Economic Affairs - Switzerland (SECO). The programmes are aimed at the improvement of capacities of national and local authorities as well as the urban population to improve resilience and adapt to urban flooding in the course of climate change.

In addition to the national level, the programmes are implemented in 16 provinces of Vietnam, namely: Bac Ninh, Hai Duong, Nghe An, Tra Vinh, Soc Trang, Can Tho, Son La, Hoa Binh, Lang Son, Quang Ngai, Binh Dinh, Phu Yen and



Khanh Hoa, Ca Mau, An Giang and Kien Giang.

ATI/MoC and GIZ are pleased to present to you the report on Resilient Cities in Viet Nam: A Guide for Planning Urban Environment Programs. The report reflects the experience gained during long years of operating in the urban environment sector together. We trust that the readers and participants of the Programme will find this report valuable to refer to in their daily work.

ATI/MoC and GIZ would like to take this opportunity to express our sincere thanks to ministerial and provincial leaders and officials for contributing to this report. We greatly appreciate the support from Mr. Hubert Jenny and Mr. Jelle Van Gijn from the Asian Development Bank (ADB), Prof. John Soussan, and in particular the Donor Coordination Group for Urban Sanitation and Wastewater Management in Vietnam.

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This report has been jointly prepared by consultants working with the Asian Development Bank (ADB) and the German Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, for the purpose as described in this report. It reflects the experience gained by both organizations during their long years of operating in the urban environment sector together with the Government of Viet Nam. The report represents the views and opinions of the authors, and does not necessarily reflect the views of Government of Viet Nam, or of the organizations, SECO, GIZ and ADB.

PART ONE: URBAN RESILIENCE AND CLIMATE CHANGE

INTRODUCTION:

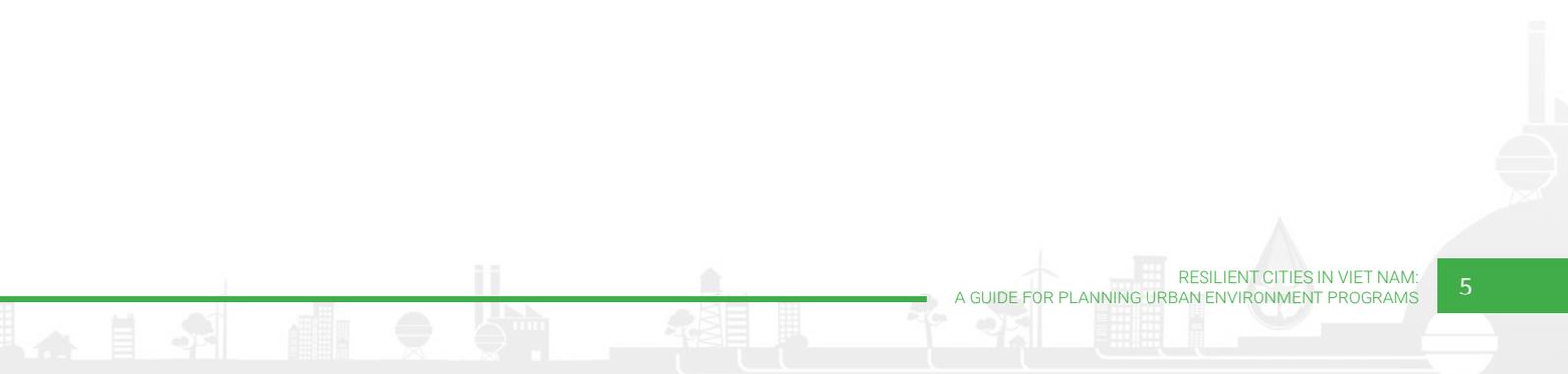
This paper has two parts. The focus of the first part is on building healthy and resilient cities in Vietnam. The economic transformation of Viet Nam in recent decades has resulted in rapid urbanization, with expanded towns and cities placing much stress on public service provision, ecologies and the environment. This part has been jointly prepared by consultants working with the Asian Development Bank (ADB) and the German Gesellschaft für Internationale Zusammenarbeit (GIZ). It reflects the experience gained by both organizations during their long years of operating in the urban environment sector together with the Government of Viet Nam.

The second part of the paper builds on the first part. The focus is 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. This part of the chapter examines two trends, firstly, rapid urbanization and changes to settlement patterns and, secondly, the risks associated with climate change and the increasing frequency of natural disasters.





Da Nang City



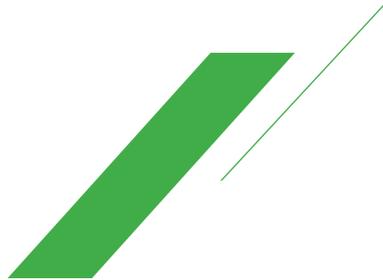
2.1 BUILDING HEALTHY AND RESILIENT CITIES

The economic transformation of Viet Nam in recent decades has resulted in rapid urbanization, with towns and cities throughout the country growing at rates that are placing tremendous strains on service provision and on the environments in which they are found. The urbanization rate is estimated to be around 3% a year and more than one third of Vietnam's population, over 30 million people, now live in urban areas. Cities give people more choices in their lifestyles and make the growth of industry and the service sector possible. However, urbanization will result in damage to human and ecological health if actions are not taken to strengthen and change the ways in which the waste products of new settlements and industrial areas are managed. The challenge is to balance the economic benefits with managing urbanization so that it does not damage the health of people and the environments on which cities depend. Cities have to be resilient to climate change and other unpredictable forces that will affect the provision of services and functioning of the economy. A recent report on Can Tho in the Mekong Delta illustrates this point well:

"Shocks and stresses have the potential to bring city systems to a halt and reverse years of socio-economic development. (...) A resilient city is one that can adapt to these types of changing conditions and withstand shocks while still providing essential services to its residents" (page 9).¹

A healthy city is one where people have access to good services and are not at risk from preventable diseases, and where the environment in and around the city is not damaged by the urbanization process. A resilient city is one that is able to adapt to changing conditions and to withstand the impacts of sudden shocks such as major storms or an economic downturn.

⁽¹⁾ World Bank. 2014. *Can Tho Viet Nam, enhancing urban resilience*. World Bank, Washington D.C.



The unsafe disposal of wastes results in widespread sickness that has human and social costs, damages productivity and is a major cost on the economy. It damages environments that, in turn, impacts on the integrity of key ecosystems such as wetlands, rivers, reefs and sea grasses. Toxic waste in water threatens food safety if the water is used for irrigation, or if fish and other animals are harvested from polluted waters. New investments in infrastructure are needed to prevent these problems. On its own this is not enough. Change is needed in the way this infra-structure is managed and, if improved services are to be sustainable, paid for.

Viet Nam has, by regional and global standards, low levels of wastewater treatment. Present estimates are that 700,000 m³ of municipal wastewater is treated each day, representing only 10% of what is produced, with the rest released into the environment. Septic tanks are found throughout the country and are likely to continue to be a major form of waste management for some time to come but the collection and disposal of sludge from these tanks is itself often a cause of pollution. Standards of treatment of industrial wastes are similarly low. The present system for handling the wastes from ever-growing cities is unable to cope with the strains being placed upon it.

These strains will inexorably increase as more and more people live in cities and as the risks and uncertainties from climate change grow. Viet Nam is recognized as one of the most climate vulnerable countries in the world and many growing cities are found in locations such as coasts where these vulnerabilities are at their height. But cities do not have to be like this. It is possible for cities to grow as healthy, resilient and sustainable places to live where people can meet their aspirations and economic development can continue without damaging impacts on the environments that support them; indeed there are many examples from around the world of where this is increasingly a reality. In the ASEAN² region Singapore is one such example, with high standards of waste disposal, concerted efforts for water and other resource recycling, coordinated flood management plans and an integrated strategy for enhancing climate resilience.³

⁽²⁾ Association of Southeast Asian Nations.

⁽³⁾ Lee Zhang Er. 2011. *Building climate resilience in Singapore's water resources and infrastructure*. Presentation to the meeting on Strengthening Climate Readiness, Kuala Lumpur May 2012.

This approach to the development of urban resilience is inherently multi-sectoral and will involve the development of a coherent approach across a range of institutions and policies. Developing urban resilience can start from a specific sector such as wastewater management but even investments and operational procedures in these individual sectors need to be made taking into account a wider range of issues and reflecting links to other sectors and the overall strengthening of urban resilience. This includes, but is not confined to, the following sets of issues:

- The management of water resources and maintenance of water and environmental quality standards through the reduction of pollution from households and industry.
- Environmental protection, to ensure the maintenance and, if necessary, restoration of ecosystem integrity in and around growing cities.
- Human health, especially preventative health activities to reduce and eventually eliminate preventable health risks associated with environmental conditions.
- Climate change mitigation, to ensure low energy and efficient patterns of urban development and service provision.
- Climate change adaptation, to ensure that patterns of urban development and infrastructure provision take account of existing and likely future changes to climate patterns and water resources availability.
- Disaster risk reduction, to ensure expanding cities are able to withstand and recover from extreme events such as cyclones, floods and droughts.
- Governance and institutional reforms, to ensure that the ways cities are governed and services are managed are responsive to and meet the needs of growing urban populations and to establish much more effective links between ministries and between local and central government agencies.
- Reforms to financing systems to establish an effective balance between local and national level financing and to ensure the sustainability of the provision of urban services.

In Viet Nam these challenges have been recognized and are reflected in recent legislation, centred around Decree 80/2014, that represents a significant new direction for the provision of these key human and environmental services. This is a major step but on its own is not enough. Concerted effort over many years is required to introduce concrete actions that translate the intent of the decree into sustainable change. These actions will take many forms and are discussed in this report. Some of the changes needed are understood, reflecting experience built up over a number of years in the reforms necessary to improve the governance and management of the sector. For these, the challenge is how to 'scale up' these experiences to cover towns and cities throughout the country.

Other actions, most crucially those to strengthen climate resilience and the need to improve levels of resource recovery and reuse, may have been recognized in the legislation but have not yet been put into practice. Further critical action is needed to stimulate investments, from both government and the private sector, and to ensure that funds are available to operate and maintain waste management infrastructure and services. Basic principles can be learnt here from international experiences but there is a need for substantial and well-constructed pilots to see how to turn principles into sustainable practice within a Vietnamese context.



*Flooding in Dong Hoi City,
Quang Binh Province in
October, 2016*

2.2 MANAGING WATER FOR CITY RESILIENCE

The traditional justification for investing in urban wastewater management is that separating waste from the human population is essential to improve and sustain public health. This was the reason for the first central sewage collection and treatment systems in the mid-19th century and it remains valid today for newly industrializing and urbanizing Asia. Once population densities increase and water usage expands, as is happening now in Viet Nam's growing towns and cities, on-site disposal systems are no longer hygienically acceptable, as the risk of transmission of infectious diseases through untreated wastewater grows significantly. The outbreak of epidemics of cholera and typhoid in the cities of London, Hamburg and North America provided the socio-political backing for the development of wastewater engineering, and the incentive for national and urban local government to invest in wastewater management systems.

The second customary objective, which became urgent in the 1970s in industrialized countries, is to protect the environment: soil and water. Wastewater if left untreated will contaminate groundwater or surface water. The water environment has a certain capacity to cope with pollution, through natural processes such as oxidation. However, when the mass of pollutants discharged becomes too much for the environment to assimilate, water becomes unfit for further downstream use, including that of sustaining its ecological functions.

In Viet Nam, this stage has now been reached in many river basins. An analysis of the balance between sustainably available freshwater resources (i.e. the supply) and the

demand for water in each river basin, complemented with projections for future water abstractions, indicate that there are or soon will be shortages in the catchments of the Red, Ma, Huong, Ba, Dong Nai and Southeast river cluster during the dry season.⁴ These projections are purely based on water quantity: they do not yet include the impact of water quality. Pollution further reduces the availability of freshwater of sufficient quality, in particular for agriculture, aquaculture or fisheries. These economic uses of fresh water, which are sensitive to the quality of water that is used, provide a source of income and livelihood to the majority of Vietnamese population.

Treating urban and industrial wastewater prior to discharge has an immediate economic benefit in terms of helping to preserve the aquatic environment and consequently securing the income and livelihoods of many people in Viet Nam. It provides an opportunity for recycling the water, increasingly a scarce resource, and the nutrients, energy and other valuable commodities that wastewater contains. It may avoid the need for future spending on the restoration and recovery of degraded aquatic ecosystems. Wastewater treatment will contribute to reducing vulnerability to climate change and greatly reduces the risks associated with water-borne diseases that can have devastating economic and social impacts.

Recent legislation on urban wastewater management has recognized this need to some extent, by introducing concepts of the reuse of treated wastewater, and of the need to use rainwater. Both concepts are critical: they recognise

⁽⁴⁾ ADB. 2014. *Country Water Assessment Viet Nam – Summary* (internal publication). ADB, Hanoi.

that freshwater must be retained and reused locally rather than be allowed to wash away downstream. The legislation sets an important strategic marker. The challenge now is for local government to apply this strategy wherever feasible, using suitable financing and regulatory instruments and technology choices as appropriate.

2.3 PURPOSE AND STRUCTURE OF THIS REPORT

This report has been prepared to support the Vietnamese government in the implementation of its urban wastewater management programme and the Flood Proofing and Drainage for Adaptation to Climate Change. It further intends to provide the basis for the preparation of a broader urban environmental improvement programme.

For this purpose, this report presents essential information and experience gained, in Viet Nam and elsewhere, to enable effective planning and implementation of sustainable and resilient approaches to wastewater management and wider urban development. It is intended to provide a basis for discussion on future needs for managing and protecting the urban environment.

The performance of the wastewater sector in Viet Nam to date is described, with the legal and institutional framework that largely determines this performance. Information essential for informed discussion and decision-making is summarized. This description and analysis is based on the considerable body of technical and institutional reports that has been prepared on the subject in recent years.

A parallel but broader long-term objective of the report is to provide an enabling platform to prepare and create a financing framework for urban environmental management, involving multiple international development partners. The concept is to develop a broad long-term investment framework for improved environment infrastructure and management for urban areas in Viet Nam, including strengthening urban climate change resilience.

This report elaborates on these issues. Chapter 2 outlines the national context and legislative framework of the sector, including overall legislation on planning and environmental protection as well as the sector-specific legal framework. Chapter 3 discusses a range of key issues that need to be understood and addressed if a sustainable future for the sector is to be promoted. Chapter 4 discusses models of good practice, from both Viet Nam and the wider world, in different aspects of wastewater management. Chapter 5 sets out an investment framework for the sector and Chapter 6 brings the discussion together to present a series of strategic conclusions and recommendations that need to be considered in the creation of resilient cities in Viet Nam.

Traffic disorders by flooding on many streets in Hanoi after heavy rains the night May 25, 2016



3.1 OVERVIEW OF THE SECTOR

Viet Nam has made remarkable progress in the last two decades in transforming its economy, reducing poverty and making the transition towards an industrialized and urban society. However, the quality and reach of urban infrastructure and services for the rapidly growing urban population have not kept pace with this transition, despite a clearly stated national vision, policy and strategy and the progressive introduction of appropriate legislation. Coverage by essential urban services is not yet comprehensive and clear evidence indicates that the benefit from growth and development is not uniform, nor uniformly allocated. The range of negative impacts of industrialization and the social and the environmental risks associated with high-density urban living can be managed but will need a concerted and proactive effort to ensure that they do not compromise the benefits of development.

The damage caused by allowing untreated waste from human activity to enter water and soil often appears to be regarded in Vietnamese pragmatic socio-political discourse as an inevitable consequence of progress. In contrast, national policies endorsed by the National Assembly claim protection of the environment as a high priority and as a prerequisite for sustainable growth and development. These policies recognize that environmental degradation primarily threatens the livelihoods and wellbeing of the poor and marginalized in society, in the absence of affordable alternatives to fundamental resources such as fresh water and clean air. The challenge for the coming decades will be to equip Vietnamese government agencies, in particular at sub-national level, with the regulatory instruments and the institutional and financial resources to commit to stated policy and fulfil the nation's vision of sustainable development and poverty reduction. The emergence of the impact of climate change, in particular in the coastal regions of Viet Nam, has made many of these threats even more urgent and necessitates a long-term response to create cities that are resilient to future uncertainties.

Da Nang City



3.2 LEGAL, POLICY AND REGULATORY FRAMEWORK

Environmental management for cities in Viet Nam is the subject of, or is influenced by, a wide range of strategy statements and regulatory instruments, as well as budgetary and financial constraints. Regulatory instruments take the form of sector specific guidelines and more prescriptive regulations on technology, as well as the set of legal instruments on spatial planning, at different levels in the hierarchy of national administration. Access to finance for the purpose of environmental management is determined by rules on taxation, budget allocation and government transfers in grant from central to sub-national government.

At the highest, most generic level of government strategy is the **Socio-Economic Development Plan** (SEDP) for 2016 – 2020, formulating Government's economic objectives for the planning period and beyond.⁵ This SEDP, ratified by the National Assembly in 2016, emphasizes protection of the environment, adaptation to climate change and the management of waste from urban and industrial areas. It indicates the target that 95% of urban households access drainage and hygienic sanitation, and 90-100% hospital waste are treated according to national standards. The SEDP places a renewed focus on more effective management of water resources, which became formally codified in the new **Law on Water Resources**.⁶ Significantly to the urban environment, the SEDP includes directives (i) to improve relevant aspects of the legal framework, with environment protection issues to feature in master plans; (ii) to develop environment protection infrastructure such as for wastewater treatment; and (iii) to strengthen (national) monitoring systems on the impacts of development.

The detailed technical regulations that guide local government in their responsibility to provide essential urban infrastructure and services, and to manage the urban environment, are formulated by the Ministry of Construction, and proposed to Government for their promulgation. These regulations have evolved over time, as priorities and insights changed globally and nationally, and as experience was gained during the early years of implementing wastewater management schemes in Vietnamese cities.

At the center of these more detailed technical regulation on urban wastewater is the recent **Decree 80/2014/ND-CP, on drainage, sewerage and wastewater treatment**, proposed by the Ministry of Construction, which took effect on 1 January 2015. This decree introduced significant changes in the government's approach to urban wastewater management, demonstrating the application of lessons learnt in the recent past. Decree 80 regulates drainage and sewerage in urban and industrial areas and sets a revised framework for the calculation of wastewater charges.

Decree 80/2014 specifies that Provincial People Committees are the "owners" of drainage and sewerage infrastructure. The responsibility for operation and maintenance of these assets can be delegated by contract to another party, termed the "drainage and sewerage entity" (i.e. an operator) in Decree 80. In practice, the local water and sewerage companies, or the URENCOs, are usually responsible for operation and maintenance but formal maintenance contracts are not yet in place for every province.⁷ The National Orientation for the Development of Drainage and Wastewater in Urban Centres and Industrial Parks in Vietnam up to 2025 with the Vision Towards 2050 was approved by government Decision 589/QD-TT on the 6th April 2016. The plan replaces Decision 1930/2009 and supports the new decree by providing further detailed quantitative targets on domestic sanitation and industrial wastewater.⁸ For a first time, orientations include targets on rainwater harvesting and the reuse of treated wastewater, consistent with the new provisions in Decree 80.

In earlier discussions on the financing principles of urban wastewater infrastructure, supported by government circulars and to some extent by funding principles of international finance institutions, the government emphasized the application of the "polluter pays" principle. This discussion suggested full cost recovery for urban wastewater systems, similar to the full cost recovery principle gradually being introduced for urban water services.⁹ Applying this "polluter-pays" principle to domestic wastewater, however, may suggest that households should be made to pay for the capital costs of a sewerage system

⁽⁵⁾ Ministry of Planning and Investment. 2011. *The Five-Year Socio Economic Development Plan 2011–2015*. Ha Noi, Viet Nam.

⁽⁶⁾ Law No 17/2012/QH13 Law on Water Resources, passed by National Assembly on June 21, 2012; effective 1 January 2013.

⁽⁷⁾ Management contracts are being piloted under the GIZ Wastewater Management Programme in its nine provinces.

⁽⁸⁾ Prime Minister, 2009. Decision 1930/2009/QD-TTg. *Approval of Orientation for Drainage Development in Viet Nam Urban and Industrial Zones toward 2025 and Vision toward 2050*. Ha Noi, Viet Nam

⁽⁹⁾ "full cost recovery" in this is defined as the cost of all operation and maintenance, as well as the depreciation of assets.

Drainage and Wastewater**Flood-Proofing and Stormwater**

Expand the wastewater collection system so that the capacity of WWTPs is fully utilized

Service coverage of the rainwater drainage systems in urban center is increased to over 70% according to base elevation and surface-water drainage level

Service coverage of the urban drainage and wastewater systems is increased to over 70%

Rainwater drainage systems provided in 100% of main roadways in urban centers as well as roadways in urban centers and residential areas

The total wastewater volume collected and treated in urban centers is increased from 15% to 20% and meets the required regulations and standards before discharge into the environment

Inundation in urban centers of grade II upwards is reduced by 50% in rainy seasons

100% of wastewater generated from hospitals and industrial parks shall be treated in meeting the regulations and standards before discharge into the urban drainage systems or to the environment

The entire drainage/sewerage system will be operated and maintained effectively to reduce urban flooding

30% to 50% of wastewater generated from craft villages is collected and treated and meets the regulations and standards before discharge into the urban drainage systems or to the environment

100% of centrally-governed cities/provinces promulgate and implement local regulations on drainage management and sewerage service price

Wastewater tariff must be replaced with wastewater charge. The user charge roadmap must aim for O&M cost recovery by 2020

Speed up socialization so that it is 10%to 15% of investment, construction and O&M

Improve the development of the sector by mobilizing all resources in society

Review, revise, add specialized drainage/sewerage plans, contents of drainage plans within urban master plans in response to the climate change.

Establish and manage flood risk maps according to climate change scenarios as well as forecast maps of areas at risks of flooding, landslide, flash flood etc. in centrally-governed provinces/cities, costal and mountainous areas.

⁽¹⁰⁾ Circular 02/2015/TT-BXD for Calculating the Price for Drainage and Sewerage Services, issued by Ministry of Construction on 2 April 2015, effective 1 June 2015.

⁽¹¹⁾ Circular 04/2015/TT-BXD for Guiding the Implementation of Some Articles of Decree No.80; issued by Ministry of Construction on 3 April 2015, effective 19 May 2015.

as well, something that is not realistic or sustainable and is not in line with international practice. More recently, the government appears to realize that considerable subsidy is essential if environmental and public health targets are to be reached. This awareness is reflected in the provisions of Decree 80.

The Decree indicates a significant policy change in financing arrangements, through the introduction of “service charges”, replacing the more ambiguous “environment fees”. The Provincial People’s Committee (instead of the Provincial People’s Council, as before) can now decide on setting charges for drainage and sewerage services, resulting in more efficient and effective decisions that are more responsive to local affordability and the demands of the market.

Two supporting Circulars were issued that detail the practical application of the decree. To date Circular 02, which was issued to take effect from June 2015, defines how the cost of sewerage services shall be determined.¹⁰ Circular 04 further interprets some of the new concepts introduced in Decree 80, in particular decentralized wastewater treatment, sludge and septage management, and specifies considerations on the use and application of treated effluent.¹¹ Two appendices provide a template for performance management contracts, between asset owner and operator or water utility.

Changes in the Decree 80 are far-reaching. They reflect fundamental changes in concepts of urban governance, in moving more authority down from central to local government, and in a shift towards more autonomous water utilities. Consistent with new global insights, the new legislation demonstrates an increasing realization of the implications of climate change and the need for greater flexibility in technology approaches, applying global concerns of resource recovery and recognizing wastewater as a resource rather than as an unwanted by-product of urban or industrial activity.

Responding to the ambiguity that prevailed amongst local authorities in applying earlier legislation, Decree 80 now explicitly states that all dischargers (i.e. households) within a service area are obliged to connect to the sewerage system (Article 30). The concept of a connection box at the plot boundary is defined (Article 31), upstream of which (within the plot and the dwelling) the householder is responsible for internal plumbing consistent with “applicable standards and regulations”. From the connection box downstream, the owner of the sewerage system is responsible. Procedures

are provided to allow financial support to selected categories of disadvantaged households to ensure all will be connected (Article 34). This support, or subsidy, can be paid from state budget or from any investment project.

The “costs” of operating the wastewater service (i.e. the full cost to the operator for running the service, which has to be established in detail), is now considered separate from the “price” or user tariff. This tariff charged to water consumers is to be approved by provincial government, taking into account affordability (Chapter V), rather than an unrealistic insistence on immediate full cost recovery. Any shortfall between the total revenue from user tariffs and the full costs has to be subsidized by the asset owner.

The new decree further removes some of the ambiguity that existed on the possibility of dischargers being charged twice (under environment charges and wastewater services charges), by stating explicitly (Article 43) that those who pay drainage or sewerage service charges are exempt from payment of environment charges (see further under section 2.4).

Reflecting more delegated decision-making, new clauses distinguish different standards for effluent discharges depending on the nature of the wastewater, where it is being discharged, and whether treatment is by a decentralized treatment plant. Standards are referred to (which still need to be defined) for discharge into the environment, centralized treatment plants, other sewer systems or to irrigation (Article 4).

Some of the features that represent greater awareness of future resource constraints are the following:

- Recognizing wastewater as a resource: encouragement to reuse stormwater (Article 20) and treated effluent from wastewater treatment plants (Article 24).
- Recognition of the need for the active management of sludge (Article 25), in terms of the obligation to remove and treat sludge, and to encourage recovery of energy and nutrients that are contained in sludge. The supporting Circular 4 makes a distinction between sludge (from treatment plants and the sewerage network) and septage (sludge from septic tanks).
- Explicit reference to decentralized systems for collection and treatment of wastewater (Article 23), with provisions for adjusted effluent standards (Article 4).

3.3 PROPOSED LAW ON PLANNING

The overall approach to development planning in Viet Nam is undergoing major changes. During 2015 and 2016, MPI prepared a new Law on Planning, which will be presented to the National Assembly for approval in October 2017. MPI's assessment of the present system of master planning indicated a range of challenges, including the low quality of many plans, influenced by personal interests and lack of accountability and transparency. Plans were limited by state management approaches, consistent with the traditional central planning model. MPI recognized that there are too many master plans (over 200) that are not coordinated and can be contradictory in their detailed provisions and targets.

Many existing plans are not clear about their management and implementation structure and are considered to be an obstacle to development market mechanisms. In many cases there is no clear identification of the department responsible for the implementation of a master plan, and the subsequent operation of facilities created. MPI concluded that the Government has issued legislation with gaps, overlaps and inconsistencies, which creates problems during implementation and that the process for drafting master

plans and implementation needs renovation. There are concerns that there is a lack of a strategic planning process in cases where lower levels are involved in the drafting and implementation process for master plans. Institutional and organizational responsibilities at the different levels of government are not clearly defined. It is recognized that a clear process to revise approved master plans is needed.

The intention of the new law is to address these concerns and to establish a consistent legal framework for drafting, appraisal and approval of master plans. The law will formulate the organizational structure for its implementation, regulate the different types of master plans and their inter-relationship. It will define principles for the master planning process, being top-down (from central to province), from the macro-level to micro. The master plan is identified as a management tool for regulating socio-economic development. It is to provide strategic direction, and to create conditions to attract investment. The legislation will establish a practical process for drafting and implementing master plans.

There will be four types of master plans:

1

The National General Master Plan outlines development according to socio-economic development, infrastructure development and natural resources development.

2

The National Spatial Master Plan is based on the national general master plan and outlines directions for socio-economic development, environment, security and defense of Vietnam's coastline and islands.

3

Regional Master Plans are based on the national general master plan and divided into sectors for socio-economic development, environment and security for the 8 regions in Vietnam.

4

Provincial Master Plans are based on the regional master plans and must outline all investment linkages to these plans. The plan presents the strategic plan for construction projects for the province and inter-district levels.

The Law on Local Government was approved by the National Assembly in June 2015. It clarifies issues that have been a concern in the designation of responsibilities in local government. It clearly classifies rural and urban administrations and defines roles and responsibilities at these respective levels. The law allocates to towns and communes the responsibility for the construction and management of public works, roads, water supply, waste treatment including drainage and wastewater according to decentralization policy approved by the Provincial

People's Committee (PPC). One key aspect of the law is that it clearly indicates that the PPC and lower levels of government have state management and asset ownership responsibility, which supports the process to establish performance management contracts. The Law reinforced the role of the People's Councils at the lower levels but there are concerns that it still lacks clear instructions on coordination for issues such as integrating urban and rural areas, or water catchment management.

⁽¹²⁾ Ministry of Planning and Investment, Law on Planning. Drafted 2014.

3.4 ENVIRONMENTAL LEGISLATION

A critical component of the Socio-economic Development Plan is the **National Strategy on Environment Protection** to 2020 with visions to 2030 (NSEP), and the Sustainable Development Strategy.¹² The NSEP recognizes that environment protection must enable sustainable development to meet the demands of the current generation while preserving opportunities for future generations. It states explicitly that investment in environment protection is investment in sustainable development. The NSEP specifies the need for urban local authorities to treat wastewater (70% of urban population by 2020) from urban areas and

operation and maintenance costs for drainage and sewerage systems. With the very low environmental protection fee for wastewater mentioned above, citizens are encouraged to discharge wastewater directly to the environment causing large environmental damage as well as significantly affecting community health. This situation is also a disincentive for households and other polluters to connect to drainage and sewerage systems, discourages investment in the drainage and wastewater sector and also creates inequality between users connected to systems who will pay more for services and those who are not connected. As a consequence, the



Heavy rain causing inundation on Le Loi street- Tuy Hoa city

from industrial zones, and to increase charges gradually so that these can contribute to the cost of wastewater management. Being a *national strategy*, the NSEP does not enter into specifics. For the wastewater sector these are covered under the legal documents issued under control of the Ministry of Construction (MOC), in its responsibility for urban infrastructure.

Separate legislation deals with *environmental charges*, aimed at reducing pollution and mainly intended to deal with pollution originating from industries and craft villages. The Government issued Decree 154/ND-CP on the 16th November 2016 on the environmental fee for wastewater. The decree increased user fees to a minimum of 10% of water supply charges but this is not consistent with Decree No.80/2014/ND-CP that requires wastewater tariffs shall be determined based on the principle of recovery of actual

implementation and enforcement of Decree No. 80/2014/ND-CP in the 63 provinces and hundreds of cities and towns in Vietnam is hindered.

Through inflation and lack of enforcement, the impact of the previous Decree 67/2003 on industry had been negligible: very few industries would install or operate wastewater treatment facilities only to avoid the penalty.

The Decree 80/2014 explicitly states that households who pay for a *sewerage service* are exempt from paying the environmental charge. However, the owner (or operator) of a waste-water treatment facility will be charged an environmental charge based on the volume and concentration of the treated effluent that is discharged into the environment.

3.5 NATIONAL-PROVINCIAL BUDGET LEGISLATION

In 2016, Vietnam's government issued Decree 52/ND-CP/2016 which shifted from providing government grant support to provinces to requiring them to take up concessional loans. This effectively means that 10 to 15 richer provinces and cities will access loans because they have the revenue to make loan repayments, while poorer provinces will not access loans and so fail in providing flood management, drainage and sanitation infrastructure and improving health for growing urban communities. Also some more richer provinces have reached their debt carrying capacity and do not qualify to take on additional loans. According to Decree 52, 20 out of 63 PPCs need more than 50% of borrowing capacity required capital investment in urban flood management, drainage and wastewater systems. To achieve the planned 80% drainage and sanitation coverage an estimated \$ 7.8 billion to \$ 14 billion is needed in infrastructure investments depending on technology. Neither government spending nor ODA will be able to finance service coverage as targeted. The existing financing gap highlights the importance of provincial leaders to make practical and feasible investment decisions and the potential role of the private sector in providing technology options for drainage and wastewater services to the urban population.



3.6 URBAN PLANNING LEGISLATION

The ability for cities to effectively manage their environment, in response to the real needs of the urban population and to climate change, is not only determined by sector legislation (as described above) but perhaps more decisively by the framework of outdated urban planning regulations that are still in force.¹³



There is a disconnect between the current urban governance systems (planning and finance) which are still the legacy of a centrally controlled planned system, 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

¹³ Schreiner, M. 2013. *The topography of the legal framework for urban development in Viet Nam*. Wilson, L. 2013. *A Planning System under Stress*. Both in *Towards green and resilient cities in Viet Nam*, Da Nang October 2013. Hanoi.



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 un-used 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 “zon-ing 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 identifying six classes of urban settlements, setting conditions for “grading” into each class, based on certain indicators (set out in Circular 34)¹⁴. This classification system drives spatial development, often in unforeseen directions. A higher classification gives higher central government fiscal grants, greater freedom to expand administrative boundaries, higher land prices, higher salaries for local government staff, and ultimately greater prestige. As a result, local authorities expand infrastructure, create economic and industrial zones (even if there is no market demand) and expand boundaries to include rural land as a means to qualify for a higher category.



Dr. Nguyen Hong Tien, ATI General Director contributed ideas for the Conference on Integrative Urban Development

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** (now the 2013 Land Law, effective since July 2014), as promoted and monitored by the Ministry of

⁽¹⁴⁾ Decree 42/2009/ND-CP on the Classification of Urban Centres, 5 July 2009; and Circular 34/2009 detailing some provisions of the Decree 42, 30 Sep 2009.

Decisions on investment in urban infrastructure and services are therefore driven by the incentives for urban local government to step up in city classification, in order to get access to greater resources from national government. The concern is linked to that of local government finance: if cities had more independent income (a greater taxation base), they would be less dependent on national government for financial resources and classification would become less of an incentive. Cities could develop based on their natural assets, quality of infrastructure and services, economic opportunity and governance efficiency.

The present planning system does not encourage urban local government to effectively prepare for the impact of

climate change. Despite having been promulgated after the National Target Program to Respond to Climate Change of December 2008, neither Decree 42 nor Circular 34 refer to climate change. Instead, the incentives propel them in the opposite direction: towards sprawl, development in high-risk areas such as flood planes, and inefficiency. Ironically, an unintended consequence of current policy is that it is rational for cities to ignore climate and disaster risks and focus on expansion. In effect it greatly reduces, rather than enhances, the resilience of cities.

Climate change references do not feature in spatial plans or related legal documents either. One exception is Article 39 in the Urban Planning Law (on Strategic Environmental



Consultation meeting on identification of site for the best management practice in An Phu Sing, Quang Ngai City

Assessments or SEA), which mentions climate change. The Law indicates that SEAs have to be prepared for general plans, zoning plans, and detailed plans. However, in view of the limited impact that SEAs have in practice, this reference to climate change is unlikely to contribute to mainstreaming climate change adaptation and mitigation in the planning of urban development.

Provincial and municipal administrations are seldom obliged to take into account requirements of climate change adaptation and mitigation in planning the future spatial distribution

of settlements. There are no legal obligations to reassess existing spatial settlement structures or to re-examine existing spatial plans through climate change resilience audits aiming at the reduction of vulnerability to climate change or other possible future risks.

In response to these shortcomings of the existing planning framework, the government has decided to formulate a National Urban Development Strategy (NUDS) as a central instrument to manage and to guide urban development in partnership with both provincial and local levels. The process is managed under responsibility of the Urban Devel-

opment Agency, within MOC. 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. The process will involve the preparation of Strategy Statements to facilitate 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.

The government has requested development partners to assist with the further development of NUDS in the coming years. In response, a capacity development technical assistance to MOC was approved, to be administered by ADB, with funding from the United States Agency for International Development (USAID) and the Nordic Development Fund.¹⁵ In parallel, the Cities Alliance will support MOC to assess current status of urban development and review international experience. Through this combined process, starting with a broad base needs assessment and service coverage inventory, the detailed outcome of NUDS may be redefined, and is likely to include specific targets on preparing cities to be more resilient to the risks associated with climate change and other future uncertainties. According to plan, the NUDS will be approved by the government in 2018.

Presently, MoC with the support of GIZ is drafting the new law on urban development management. This law establishes state management responsibility for the development, investment, and allocation of financial and human resources for sustainable urban infrastructure. Importantly, national leaders are committed to include new modalities of urban development in the new law such as urban resilient cities, green cities and SMART cities. The draft law will be presented to the government in December 2017, and presented to the National Assembly in May 2018.

3.7 MINISTRY OF HEALTH AND URBAN HEALTH

The Ministry of Health is in the process of adopting policy actions consistent with WHO's forthcoming "Regional Framework for Urban Health in the Western Pacific", and merge it into national orientations. This framework encourages member countries to integrate urban health measures in sustainable development plans to improve cities, and recognizes that infrastructure that builds resilience in cities can change the outcome of natural hazards and emergencies.

This trend matches the new focus of MOH towards urban health, as a transition from its traditional responsibility for just rural sanitation under the National Target Programme for Rural Water Supply and Sanitation. MOH's responsibility for monitoring the quality of all drinking water extends its concern to the quality of groundwater, and therefore to the



Flooding in Dong Hoi City, Quang Binh Province in October, 2016

functioning of septic tanks in urban areas, being a major source of man-made contamination of groundwater. MOH therefore encourages the phasing out of septic tanks in densely populated areas by constructing sewerage systems, or at least improving their functioning by regular maintenance.

Governance links between environmental pollution and drinking water quality are further illustrated by the concept of *water safety plans*. Viet Nam has embraced the global move towards water safety plans as a guiding principle in the management of water utilities. The aim of water safety

⁽¹⁵⁾ ADB CDTA 49135-001, *Sustainable and Resilient Urban Development*. Manila.

plans is to encourage water companies to consider the entire water cycle, including the water catchment area, in their risk assessment of securing a reliable supply of good quality drinking water. In Viet Nam, the cause for water safety plans is championed by the national WHO office, starting with a first phase in 2007, with financial support from Australia. Government counterpart agencies are MOH for the monitoring of water quality standards, MOC for urban water supplies, and MARD for rural water supply. The governance basis for the realization of water safety plans is the Circular "Guiding the implementation of water safety plans" (08/2012/TT-BXD) in November 2012, defining the concepts and the responsibilities for respective state agencies at provincial, district and commune level.

The health sector development plan includes strengthening environmental health. Policy is limited to access to clean water and hygienic latrines. Reducing the impact of air pollution on health is the main focus of the plan. Craft villages are indicated as a health hazard because work conditions are not supervised and waste generated in commercial activities is not treated prior to disposal. Gaps include the lack of a legal and policy framework to link health, environment and urban infrastructure, concerns over awareness about the need to develop linkages, and inter-ministerial coordination to plan and carry out measures for resilient cities. At the provincial level, inter-departmental coordination is more effective, as evidenced to some extent with experience on the delivery of the National Target Programme for Rural Water Supply and Sanitation.

The health development plan for 2016-2020 was approved in 2016. In general terms, and relevant to urban health, the plan states as objective that government "should ensure that no epidemics occur", and "should control the elements in the environment that are harmful to health" This will include therefore measures to improve public health infrastructure, such as flood-proofing, drainage and sewerage.



Heavy rain causing inundation on Tran Hung Dao Street- Tuy Hoa City (in front of the city's post office)

3.8 PUBLIC PRIVATE PARTNERSHIPS

Responding to the needs for creating resilient cities requires considerable investment and management efficiencies. Government recognizes it needs the private sector in achieving their targets. Private sector partners can play a critical role in bringing improvement in urban resilience, by introducing efficiencies, innovation, and new business processes based on effective asset management, and in enforcing standards for performance and service delivery. Private sector partners can secure new funding mechanisms for investment in system rehabilitation and expansion, service improvements and modern management systems.

A new decree on public private partnerships has been introduced with the aim to attract greater private sector



involvement. Decree 15/2015 has helped to define the process, adding the concept of viability gap funding and new contracts types such as build-transfer-lease and build-lease-transfer. It changed the cap on the use of State capital from a percentage of total investment to one based on the project needs. Financial support is now available during project selection and development, from a dedicated Project Development Facility (PDF).

The new decree will help to streamline the entry of private investments into the urban environment sector. But constraints, in particular lack of clarity, remain to be resolved in order to attract more interest. Risk allocation principles for PPPs need better definition, to assist

project sponsors and lenders to understand better which risks will be transferred to them. The availability of foreign exchange for the conversion of project revenue in local currency into foreign currency, and the remittance of the foreign currency out of Viet Nam, remain unclear. The decree still lacks guidelines on the standard approaches to the calculation of termination compensation to be made to project sponsors for termination upon the default by the Government.¹⁶ Relevant line ministries need to progress the implementation of the new decree within their sector of the economy, with specific criteria for the assessment and prioritization of proposals. Development partners will continue their dialogue with government to achieve the full intended benefit of the new legislation.

3.9 CONCLUSION

The discussion in the sections above shows that there is a wide range of legislation across multiple sectors that needs to be considered in the development of approaches to advancing urban resilience in contemporary Viet Nam. The limitations of much of the legislation that has in the past guided urban development and service provision is clear, reflecting their origins in the traditional central planning system. There have been recent changes to legislation in many of these areas, changes that in some cases are still in progress with the need to further specify the details of institutional responsibilities and implementation and financial mechanisms if they are to be effective.

The provisions of Decree 80 are the future foundation for building healthy and resilient cities in Viet Nam but these need to be linked to wider changes in urban governance and planning as well as key sectors such as health and environmental protection. Establishing a clear framework for financing the construction and operation of essential urban infrastructure and services is also an important issue. Taken together, these changes to legislation and thinking on urban development in Viet Nam set a direction for more sustainable and resilient urbanization. The challenge for the future is to ensure that this potential is turned into reality.

¹⁶ Frasers Law Company. 2015. *Public-Private Partnerships in Viet Nam*. Available online: <http://www.frasersvn.com/wp-content/uploads/2015/06/Legal-Update-PPPs-2015.pdf>

4.1 OVERVIEW

The approval of Decree 80 in 2014 represents a major change in the government's approach to the management of wastewater in Viet Nam. As Chapter 2 showed, it is broad in scope and requires further legislation in the form of circulars to define the mechanisms through which the policy intent will be put into practice. The decree needs to be understood and interpreted within a 'resilient cities' context, as a key part of the legislative and regulatory framework necessary for the development of an urbanization process that creates healthy and resilient cities. This chapter discusses a number of issues that need to be resolved if the intended outcomes are to become a reality. The implications of the new decree are far-reaching and, should they be realized, will result in a fundamental change in the way that an essential urban service can be provided. Governance and management, economics and finance, and technology choices, all need to be considered if effective wastewater services are to be developed in an efficient and sustainable manner for urban and peri-urban areas in Viet Nam.

4.2 INSTITUTIONS AND GOVERNANCE

Decree 80 defines a shift in the framework of institutional responsibilities for the governance of wastewater management. The decree introduces a 'subsidiarity' approach with responsibilities devolved to the lowest appropriate level. At the heart of this is the creation of a province-level system for planning and regulating wastewater management within individual provinces. This reflects wider decentralization trends that have been manifest in Viet Nam for several years. It allows the details of wastewater management systems to reflect the specific characteristics of different provinces. Settlement patterns, environmental conditions and levels of development vary widely across the country. The approach initiated by Decree 80 ensures that these variations in background conditions can be taken into account in the development of wastewater services.

Critical for considering investment in new wastewater management facilities will therefore be the establishment of a provincial regulatory framework. Decree 80 is clear that PPCs are responsible for the formulation and approval of provincial regulations on the management of drainage and wastewater networks in urban areas, export-processing and industrial parks, economic zones and rural residential clusters. The regulations that PPCs enact should reflect local conditions and existing service provision levels. Regulations must cover standards of service provision, the ownership of assets and its implications, contractual arrangements,

reporting systems and the financial obligations of the different parties involved.

The key issue is whether provinces have the resources to undertake these responsibilities in an effective and comprehensive manner. In most provinces, creating a regulatory framework for the management of drainage and wastewater systems has not been a priority. In consequence, provinces lack a clear orientation for key aspects of the sector, such as the selection of technology suitable for local conditions; institutional arrangements and capacity development; and importantly, securing financial resources to sustain systems. The lack of financing and institutional arrangements for operation and maintenance has led to the degradation of existing drainage and wastewater systems. The funding deficit is further compounded by the reluctance of many provincial leaders to charge users for drainage and wastewater services despite this being an established national policy.

Issuing provincial regulations is a practical step for improving implementation in three key and inter-related areas for the sector: technology, finance and organization. Some provinces have promulgated provincial drainage and wastewater management regulations but these demonstrated limitations in being fragmented, inconsistent and overlapping. Most regulations are only applicable to provincial capital cities and do not relate to the management



Dr. Dirk Pauschert – GIZ Programme Director is discussing on urban resilience with Mr. Gunther Adler, State Secretary of the German Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety at VietWater 2016

of systems in lower level cities and towns in provinces. Regulations often lack specific articles on the management of systems in industrial zones and handicraft villages. Between provinces, regulations show inconsistency in structure and content. Important aspects of the regulatory framework are often missing in the promulgated provincial regulations, such as a policy on compulsory connections, a framework for service tariffs, the performance contract

between asset owners and service providers or operators.

Some provinces have received support from development partners to develop provincial regulations, such as from Danida (in Dak Lak), the World Bank (Quang Binh, Binh Dinh, Khanh Hoa) and JICA (Binh Duong). However, these regulations tend to be focused on specific elements of the system, such as household service connections and wastewater tariffs, and are mainly intended to facilitate the implementation of ODA projects in provincial capital cities.

GIZ has two urban resilience programmes. The GIZ Programme¹⁷ “Flood Proofing and Drainage for Medium-Sized Coastal Cities in Vietnam for Adaptation to Climate Change” builds on the existing national legal and policy framework and supports MoC and provincial level to demonstrate climate change adaptation measures in urban drainage planning. Establishing practical measures in urban drainage planning as well as an updated national policy framework and implementation guidelines are critical for sustainable urban development in Vietnam. A second phase of this programme started in 2017 with three components: support to national level, flood risk management, urban planning and early warning systems in Ca Mau, Kien Giang and An Giang.

GIZ’s Wastewater Management Programme (WMP) is supporting nine programme provinces, to implement Decree 80 and to prepare provincial regulations for the management of the drainage and wastewater sector in the provincial capital and other urban centres, industrial zones and craft villages.¹⁸ The content of these provincial regulations includes orientation development planning; institutional arrangements for both the construction and the operational phase; the roles and responsibilities of key stakeholders (assets owners, service providers or operators, and service users) with performance management contracts between assets owners and service providers, and a service contract between service providers and service users; and a policy on tariff roadmaps and calculation and allocation of financial resources for operation and maintenance.

A regulatory authority for the drainage and wastewater sector that covers all provinces in Viet Nam should be a long-term objective. Experience from GIZ’s WMP shows that the establishment of performance management contracts and tariff roadmaps is complex and involves a negotiation process, for each province separately, between a range of provincial stakeholders, including provincial and city government and their respective departments, and the service provider. After functions and responsibilities are

clearly established, the role of such a regulatory authority would be as an independent body that both government and third parties could rely on for an objective appraisal and decisions, as adviser on user charges or as arbiter on contractual disputes between the asset owner and the service provider.

The primary objective of the regulatory body is to regulate certain utilities to ensure the provision of safe, reliable and affordable services and to maximize access to services throughout urban areas in the province. The role of the regulatory body generally involves regulating prices, service standards, market monitoring and consumer protection. The regulatory body investigates and advises the state management departments on regulatory matters that affect



Speakers at the Conference on Integrative Urban Development, 24-25 October, 2013

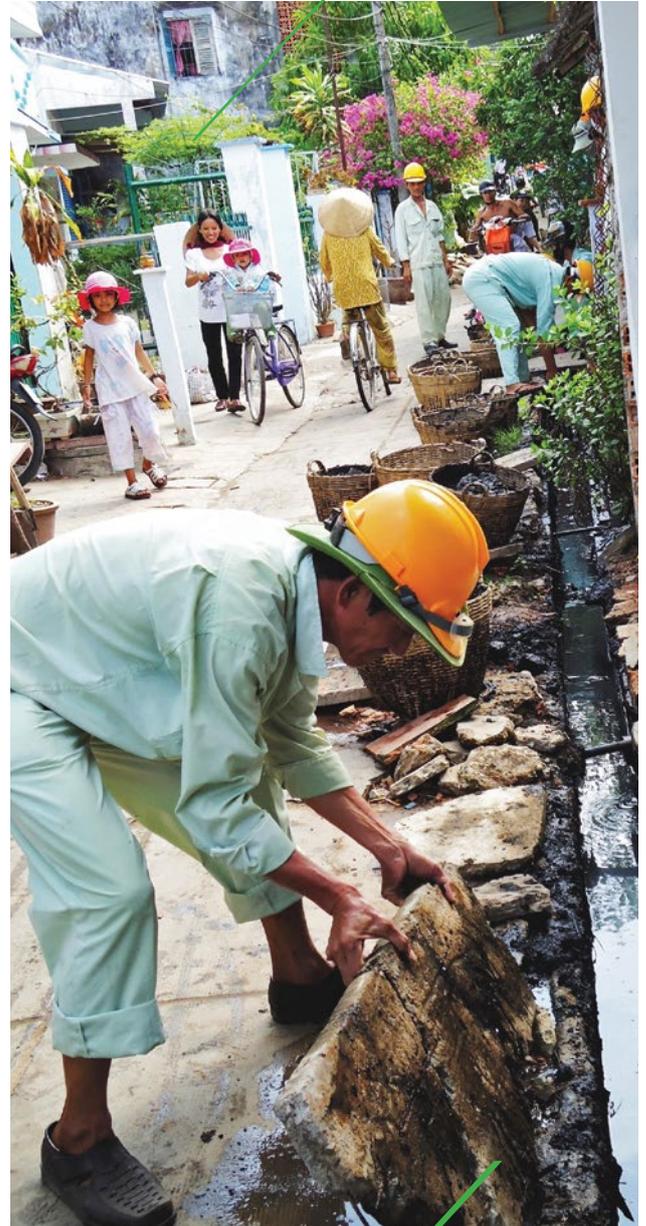
⁽¹⁷⁾ Further information about the FPP is presented in the urban resilience working papers.

⁽¹⁸⁾ “Wastewater and solid waste management in provincial centers”, operating in Lang Son, Son La, Hoa Binh, Bac Ninh, and Hai Duong in the north; Vinh in the centre; and Tra Vinh, Soc Trang, Can Tho in the Mekong Delta.

wastewater service utilities. Decisions by the regulatory body will affect consumers and users of these services, as well as the regulated businesses that provide those services. For this reason, the regulatory body should aim to be open and transparent in decision-making, based on consulting with as many people in the broader community as possible. Public participation in regulatory processes enhances the relevance and effectiveness of decisions.

Critical to achieving the vision of Decree 80 is the development of efficient and sustainable operation and maintenance systems. The decree does not prescribe how this should be organized, referring the decision to the PPC of any particular province. Whilst this does provide flexibility, it raises the issue how to ensure consistency of standards in operation and maintenance. Based on GIZ's experience in nine provinces, the establishment of an organizational service model for the efficient and effective O&M systems is a practical step for improving the maintenance of all parts of the system. This needs to extend from connection boxes, tertiary sewers, secondary and trunk mains, pumping stations, regulation lakes, treatment plants and outlets ('A to Z'). It should extend beyond the public drainage and wastewater system and include household facilities such as septic tanks, and sludge removal and treatment by the private sector.

In large cities, such as Hanoi, Ho Chi Minh city, Hai Phong and Da Nang, dedicated service companies established by the People's Committee are responsible for the O&M of some or all elements of the city drainage and wastewater system. Most of these companies are still state owned, while some have been partly equitized. These companies are responsible for the provision of drainage and wastewater services but a performance contract, as now required by Decree 80, is not in place. Service companies are not responsible for preserving the value of the drainage and wastewater system assets, nor for asset management. They carry out the dredging and



Dredging the canals



Workers are trying to salvage junk to unfreeze the water in a drainage canal in the center of Hanoi on May 25, 2016

cleaning works whenever necessary and get paid based on the verified volume of work completed.

Different models are in place across provincial capital cities (class 2 and 3 cities). For example in Hai Duong city, an urban infrastructure management joint stock company is responsible for the O&M of every element of the drainage and wastewater system. A different model is found in Bac Ninh City where the PPC allocated responsibility for primary and secondary sewers and treatment facilities to the Bac Ninh Water Supply and Drainage/Sewerage Company. The tertiary network was the responsibility of ward administration. Further operational models can be found in other cities throughout the country.

Annual planning and budgeting for O&M is often erratic. There are particularly significant problems in management of systems in the smaller class 4 and 5 towns. Such towns provide little economy of scale and usually have no organization responsible for the maintenance of systems. Often no maintenance is carried out but only emergency repair, on a short-term work order basis.

Despite these challenges, innovative organizational models for the management of urban drainage and wastewater systems exist in Viet Nam. For example, in Thua Thien Hue, the PPC allocated responsibility for operation and maintenance of drainage and wastewater systems in all urban centres in the province to the Hue Environment Protection Company - a single-member limited state company. In addition to its role in urban centres, the company is also responsible for improving access to sanitation in rural areas.

During the construction phase of urban drainage and wastewater system, it is critical that the PPC establishes institutional arrangements for the management and coordination of the infrastructure. In addition, PPC should develop regulations and define roles, responsibilities

and procedures, in preparation for the post-construction operational phase.

A practical option for institutional arrangements is where the PPC establishes an infrastructure support unit for investment projects and preparation for post-construction management arrangements. The infrastructure support unit could be led by the Office of the PPC and other departments and could contract local experts to ensure high quality and standards. This institutional model has been used in Thua Thien Hue province with good results.

Provinces need assistance and direction to ensure the establishment of sustainable systems for operation and maintenance. MOC should issue guidelines for PPCs and CPCs to engage one service provider to be responsible for the O&M of all elements of drainage and wastewater systems in urban, industrial zones, handicraft villages and rural residential clusters. This should include sludge treatment facilities. Private sector companies can compete for the maintenance contract for these systems, or for specific elements within systems, with preference given to creating economy of scale, technical expertise and support.



Danang City

4.3 FINANCING OF OPERATION AND MAINTENANCE

Financial mechanisms need to be developed if the sector is to build a long-term sustainable structure that ensures adequate levels of service provision. Decree 80 identifies several of these but details are not yet established. These mechanisms need to combine principles, such as “polluter pays”, with practicality, reflecting the willingness of consumers to pay and the budgets available to provincial authorities.

In Viet Nam, the term “cost norms” has become a general concept for planning and budgeting purposes. For service

providers these norms present a basis for annual and longer term financial planning. In the form of benchmarks, they are a useful indicator of how efficiently a company is being run, and where possible increases in efficiency or cost savings should be sought. For state owned service companies, they can also provide guidance to administrators on the relative performance of their companies and allow questions to be asked about why the performance is better or worse than the cost norms or benchmarks.

Decree 80 requires service companies to calculate a budget for carrying out O&M of all elements of the drainage and sewerage system. Presently the state must contribute to this budget through allocations under established financial

planning systems at province and national levels. Many inconsistencies, gaps and overlaps remain in policies and regulations on cost norms for O&M of drainage and sewerage systems. It is difficult for state management agencies to carry out this work and often the result is provincial stakeholders promoting different options based on different legislation. The existing cost norms do not support the calculation of the actual annual costs for performance management contract as required by Decree 80. The absence of cost norms for certain elements of the process, such as for the operation of treatment plants and pumping stations, results in inconsistent calculation of

effectively calculate the actual annual costs and defend decisions before auditors, treasury and state inspectors. In contrast, MOC indicates in Item 2 of Circular 02 that developing additional technical specifications and cost norms is under the authority of the PPC, thereby ensuring that the technical specifications and cost norms were practical and based on local conditions. Meanwhile, the provincial authorities are waiting for the national specifications and cost norms from MOC.

A key challenge is consequently to establish a flexible national cost norm framework, with coefficients for the



Da Lat Wastewater Treatment Plant, Lam Dong Province

costs across the provinces. The consequence of this is that key policies such as the performance management contract cannot be implemented and the provincial tariff roadmaps are not established.

Provincial stakeholders consider the establishment of a national system for technical specifications and cost norms essential for calculating actual annual costs of O&M. Without national guidelines, state management authorities are reluctant to approve cost norms for local conditions. Stakeholders insist that they require MOC to establish the legal and state management framework so they can

different geographical regions in Viet Nam, that provides norms (price caps) and a specific range of basic salary of the workers providing public services. Price caps and basic salary levels can then be adjusted in provinces according to their local geographic and economic conditions. In the future, a regulatory authority could set up this framework. The provincial Departments of Construction and of Finance need a cost norm framework (including labour, energy, chemicals and other consumption items to carry out the O&M), so that they can effectively review the budget proposal submitted by the companies. A unit could be a unit length of sewer network, broken down by class or diameters, or treating one cubic meter of wastewater.

Circular 02/2015/TT-BXD for Calculating the Price for Drainage and Sewerage Services was issued by MOC in April 2015 and came into effect in June 2015. The circular is an important guideline for the implementation of Decree 80 and has clarified many issues in calculating service charges but there remain issues that need examination and further explanation. The decree indicates a significant policy change in financial arrangements; service fees were replaced by service charges. This means that the Provincial People's Committee has replaced the Provincial People's Council in decision-making about financial arrangements including charges for drainage and sewerage services, which will result in faster, more efficient and effective decisions that are more responsive to the demands of the market.

Circular 02 indicates the method to calculate the full cost of operating and maintaining drainage and sewerage services, irrespective of the type of technology used in conveying or treating sewage. This is critical because most systems in Viet Nam are combined systems. The circular creates the conditions for local authorities to calculate the full cost of O&M, independent of the type of technology, for example biological or mechanical wastewater treatment. It develops an enabling environment for establishing the price of a performance management contract for the O&M of the system, between the service provider and the asset owner, and of a tariff roadmap. The circular outlines that the actual costs of services include:

- a. Costs of operating and maintaining the system such as labour cost, electricity, materials, fuels, and general management costs;
- b. Depreciation costs of the *owner's* fixed assets, such as the sewerage networks, pumping stations, wastewater treatment plants, and storm water regulation lakes;
- c. The depreciation cost of the *operator's* fixed and mobile assets, such as offices, vehicles, machines, and O&M equipment that the operator has procured for the purpose of providing its services; and
- d. Other costs, such as taxes and duties according to the law and regulations.

The circular is consequently an important step towards resolving the issue of how to calculate operating costs in a situation of great diversity of technologies and service requirements across the country. A number of issues, however, need to be resolved before the system becomes fully effective. These include the lack of information related to the ownership and the detailed definition of fixed assets

in drainage and sewerage systems. These data are essential if realistic cost norms and asset depreciation rates are to be calculated. They will also affect the application of "performance management contracts" to replace the "work order contracts" as prescribed in Decree 80. Technical specifications, indicating the standards to which all elements of the system should be maintained, are essential to accurately calculate the financial conditions of the performance management contract.

On 30 May 2014, MOC issued the Decision No. 591/QD-BXD on norms for estimating a reasonable cost for the maintenance of urban drainage and sewerage systems.



Workshop on the Decree No. 80/2014/ND-CP and Circulars guiding the Decree implementation, 15-16 June, 2015

However, a number of issues are not covered by this decision or other regulation, or remain uncertain in their detail:

- The existing cost norms issued by MOC and updated by provincial authorities mostly support the calculation of the work value based on the volume of the sludge removed from the drainage or sewerage systems in specific work areas ordered by the asset owners. Cost norms do not support the calculation of the actual annual costs under a performance management contract as required in the Decree 80. Without national guidelines, state management authorities are reluctant to approve cost norms for local conditions.

- Inconsistencies in legal documents and implementation guiding documents have yet to be resolved, meaning that many provincial authorities are reluctant to act without such clarity in the regulatory system governing their actions.
- The method for allocation of general management costs, including all executive, organizational and clerical costs, is not clear. Companies have insufficient incentive to save costs and improve efficiency in their operations.
- Depreciation for drainage and wastewater assets is not clearly defined. In particular, Circular 02 does not separate depreciation for fixed drainage and sewerage assets from

residential clusters. This initiative paves the way for water, drainage and wastewater management according to water catchment areas. However, the Circular 02 does not provide guidance on the practical implementation of such a concept, or the role of MARD and line agencies in this.

- Industrial clusters and trade villages have caused significant environmental damage in all provinces in Viet Nam. Circular 02 encourages industrial clusters to apply its provisions, but without clear guidance and an effective implementation and enforcement system, implementation in the provinces is unlikely to be effective.



Roundtable on Provincial Regulations on Drainage, Sewerage and Wastewater Treatment and Wastewater Tariffs Roadmap

recurrent O&M costs. This lack of clarity is likely to result in high annual operating costs and consequently high service tariff charges.

- COD is used as the water quality parameter to determine the level of charges for drainage and wastewater services, based on chemical analysis from a recognized laboratory. Sampling and analysing for COD may not be practically feasible for polluters such as small businesses, restaurants and hotels.
- An important initiative presented in Decree 80 was the extension of drainage and waste-water management to rural

The management contract model outlined in Decree 80 in practice leads to a lump sum contract. This is a very different way of working than the previous work order and requires a change in thinking by provincial leaders and departments with state management responsibility. Clear guidance on how to achieve this change is needed for many provinces.



Vinh Wastewater Treatment Plant, Nghe An Province

4.4 TECHNICAL MANAGEMENT ISSUES

Some critical issues on the technical management of wastewater systems need to be resolved if Decree 80 is to become fully effective. Technical specifications for all elements of drainage and wastewater systems are essential as the basis for a performance management contract. Article 19 of Decree 80 indicates that asset owners sign a performance management contract for a minimum of five years and a maximum of ten years. The contract must cover the operation and maintenance of all parts of drainage and wastewater systems within a natural water catchment area, which should include natural ditches and canals.

Components of the wastewater and drainage system (see Box 1) depend on topographical conditions and will vary across the provinces. Systems in mountainous cities and towns where strong rain and gravity significantly reduce the volume of residual sludge require different infrastructure to flat delta cities and towns where pumping stations and regulation lakes or reservoirs are important.

BOX 1

COMPONENTS OF DRAINAGE AND WASTEWATER SYSTEM

According to Decree 80/2014, the elements of the drainage and wastewater and system include (i) household connection boxes, street inlets, including the screens and sand settling facilities; (ii) primary, secondary, tertiary drainage/ sewerage network; (iii) combined sewer overflows, wastewater pumping stations, interceptors and pressured sewers, conveying wastewater to treatment plant; (iv) regulating lakes and channels; (v) drainage pumping stations; (vi) outlets, tide gates; (vii) wastewater treatment plants; (viii) sludge treatment facilities.

Standard operational procedures (SOP) should therefore be formulated for each element of the wastewater and drainage system, together with the technical specifications.

These technical specifications and SOPs will provide the legal basis and benchmarks for relevant provincial stakeholders to estimate the resources required for labour, machinery, energy, chemicals and other consumable items. They are also essential for state management agencies to supervise and monitor compliance with service provision contracts. Once technical specifications are defined, cost norms can be applied to determine the actual cost for the operation and maintenance of the drainage and wastewater systems. This calculation thereby forms the basis of assessing the price for the performance management contract and for establishing the tariff roadmap for cost recovery.



MOC should therefore issue a unified set of national technical specifications for the operation and maintenance of wastewater and drainage systems, providing a guiding framework for all regions in the country. The preparation of the technical specifications should be linked with the drafting of the relevant cost norms.

A performance management contract is a legally recognized document signed between the owner of the drainage and sewerage system and the entity assigned to manage and operate this system. Importantly, this legally separates the responsibilities of the asset owner from those providing the management services. For nearly a decade, performance management contracts have been part of the national policy framework for the sector. However, they have seldom been applied in practice. The principle of performance management contracts between the asset owner and the service company is important for improving the efficiency and effectiveness of the operation and maintenance of all

elements of the drainage and sewerage systems and help ensure service provision is responsive to market forces. It is a prerequisite for the involvement of the private sector. Investors must be confident that they will receive agreed payment at the agreed time. However, the implementation of performance management contracts in the provinces has not been a priority, an issue that is affecting the realization of the approach set out in Decree 80.

The performance management contract is based on the premise that funds are guaranteed to carry out annual O&M of the entire drainage and sewerage network as indicated in Decree 80. A sustainable source of revenue for wastewater services is critical to guarantee adequate funding to enable local government to honour its obligations under the performance management contract.



Soc Trang Wastewater Treatment Plant, Soc Trang Province

Significant governance issues affect the transition to performance management contracts. Competing interests among stakeholders form barriers to the signing of the performance management contract. In some provinces, formal and informal financial arrangements were established under the work order system among stakeholders, who now do not want to change these arrangements. These existing modalities are in many cases at odds with the requirements for the governance of wastewater and drainage systems set out in Decree 80. Resolving these issues is hampered by a lack of consistent, complete and verifiably information on the characteristics of the existing systems as well as a reluctance to impose the additional charges that the introduction of the new system could entail.

A detailed structure of new procedures and responsibilities is needed if there is to be a consistent application of the principles and approaches set out in Decree 80, an issue discussed in more detail in chapter 5 of this report. Replacing the remnants of the old central planning system with performance management contracts, based on stakeholder negotiations and providing incentives for sustainable service provision, is at the heart of the new approach set out in the decree.

One feature of technology choices and management concerns the options for decentralized wastewater management. Decentralized wastewater systems in this context can be defined as stand-alone sewage collection and treatment networks that serve a defined catchment within a larger urban area. Typically, a decentralized system serves a population of up to 10,000 households.

The characteristic advantages of these systems are that they reduce the need for sewage pumping stations and large-diameter sewage collectors at great depth, and that they may be planned, phased, and implemented with less hindrance than centralized systems with large infrastructure. It is usually more manageable to identify and procure several small plots of land than one single large plot to locate the treatment facility. When taken to the extreme, decentralized treatment units can be installed for a single high-rise building, located in its basement, or can serve a high density urban neighbourhood, constructed underground, e.g. below a playing field.

Decentralized sewerage systems can be designed as



shallow sewers or small-diameter sewers, further reducing the need for excavation of deep trenches. Practical problems with introducing sewage collection systems in existing high-density urban areas of Viet Nam may be reduced by using advanced trenchless technologies. The higher cost of using specialized construction techniques will be offset by the economic benefits of reduced excavation and disruption. When energy costs increase significantly, as can be expected when subsidies are phased out, the relative benefits of decentralized options will become more pronounced.

The high population densities of many Vietnamese urban settings point to small footprint (i.e. high flow rate) solutions. This will generally require mechanized, high-technology processes. In the current stage of development of Viet

Nam this may appear to present a considerable challenge because of the skills required. However, it is not a prohibitive condition. It may be argued that it will be more economical to create skills by training than it will be to find and acquire land in urban areas, with resulting resettlement needs.

An important advantage in the use of decentralised wastewater treatment is that it offers the opportunity to re-use treated effluent locally, thereby reducing fresh water pumping costs and allowing the wastewater treatment cost to be offset by these benefits.



Decentralized wastewater treatment plants in Can Tho and Bac Ninh

4.5 CONCLUSION

This chapter has reviewed a range of issues that need to be addressed in an integrated and efficient manner if wastewater management in Viet Nam is to develop in ways that enhance the resilience and health of cities and their growing populations. Further work is needed to identify the best way forward within a Vietnamese context. A legislative base has been established that creates a framework for more effective and sustainable approaches. Measures now need to be identified through which policy intent can be put into practice. Experiences that can be built on in this process are considered in the next chapter.



Workshop on upscaling decentralized wastewater treatment systems, Can Tho, 4 October, 2016

5.1 OPTIONS

The issuance of Decree 80 in 2014 marks a major change in the national approach to wastewater management in Viet Nam. The Decree provides a basis for the creation of a sustainable response to an environmental risk that, with rapid urbanization and industrialization, will be of increasing importance in the coming decades. However, further work is needed to bring the intent of the decree to reality. Chapter 3 outlined some of the immediate issues that need to be resolved, through further legislation or through institutional capacity building. This chapter considers examples of good practice from Viet Nam and, where appropriate, further afield in the ASEAN region and beyond that can inform the direction of change in Viet Nam. In particular, the examples discussed give guidance on the levels and types of changes needed to investments and to management practices if the sector is to develop in an effective and sustainable manner.

Four key examples of good practice are considered, all of which are referred to in Decree 80 but for which the appropriate pathway of development for Viet Nam has yet to be agreed. The first draws upon the WMP programme that has been implemented by GIZ and Vietnamese

partners at both the national level and in nine provinces. The second reflects ADB experience over a decade in urban environmental management and improvement in the central region. The third and fourth aspects, climate change adaptation and resource recovery and reuse, are principles that are identified in Decree 80. However, little experience on these issues is available in Viet Nam so examples of good practice from further afield are considered.

As Table 5.1 shows, Viet Nam lags behind many other South-East and East Asian countries in terms of the percentage of municipal wastewater that is treated. This is in part because historical and recent levels of investment have been higher in most countries (reflecting a higher priority given to the sector) and in part because the effectiveness of management and coordination in the sector is greater. One of the goals of this report is to show that this is not inevitable, that a way forward exists for Viet Nam to significantly improve its performance in this key development sector where rapid urbanization means that the challenges will inevitably grow in the future as the country continues to develop.

Table 5.1

Key Data on Wastewater Management in South-East and East Asia¹⁹

Country	Municipal Wastewater (km ³ per year)		
	Produced	Treated	% Treated
Viet Nam	1.97	0.20	10
China	37.98	26.61	70
Japan	16.93	11.56	68
Indonesia	14.28	n/a	1*
Republic of Korea	7.84	6.58	84
Malaysia	4.22	2.60	62
Philippines	1.26	n/a	3.5**
Thailand	5.11	1.17	23

⁽¹⁹⁾ From Mateo-Sagasta, J., Raschid-Sally, L. & Thebo, A. (2015) *Global wastewater and sludge production, treatment and use* in Drechsel, P., Qadir, M. & Wichelns, D. (eds. 2015) *Wastewater: economic asset in an urbanizing world*. Springer, New York. * Note Indonesia data from: WSP. 2015 *Water supply and Sanitation in Indonesia*. Washington DC. ** Philippines data from: WSP. 2015 *Water supply and Sanitation in Philippines*. Washington DC. % of urban population connected to sewerage system with treatment.

5.2 THE WASTEWATER MANAGEMENT PROGRAMME

Programme Principles

The Wastewater Management in Provincial Centres in Viet Nam Programme (WMP) is jointly implemented by the Ministry of Construction (MOC) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development. The co-operation programme is implemented in nine provincial cities. The programme started in 2005 and finishes in 2017.

The objective of this section is to outline the innovative approach GIZ, in partnership with Vietnamese organizations, has developed in carrying out the WMP. The approach is based on GIZ's experiences and lessons learnt after decades of support to the GOV. The intention of the approach is to put government partners in the driving seat of their development so that they are able to take responsibility and be accountable for outcomes. The approach ensures the partners are in close accord with Viet Nam's legal and policy framework.

The following guiding principles for WMP are based on the Hanoi Core Statement on Aid Effectiveness and guide programme strategic planning and implementation:

- Build on existing policy and regulatory frameworks as the basis for the development and ensure the institutionalization of policy and regulations and other arrangements for urban wastewater management.
- Conduct programme activities using existing government institutions and companies as a basis for promoting sustainability.
- Strengthen the urban wastewater management network as a process that effectively engages and links all levels of government as well as other stakeholders including the private sector. Link the national legal and policy framework with the community, especially vulnerable groups.
- Consider improvements to urban wastewater management as more than a technical issue or the construction of infrastructure. Approach improved access to urban wastewater management as a socio-development issue, involving community participation; as a state management issue because a clear policy and regulatory environment is needed; and as a public administration reform issue because it requires clearly defined procedures, roles and responsibilities of local authorities and public service companies.



Implementation Agreement Signing Ceremony of the Wastewater Management Programme Phase 4 between MoC and GIZ

The WMP Approach



Dr. Nguyen Hong Tien, ATI General Director, MoC and Dr. Dirk Pauschert at the Workshop on Decree No. 80/2014/ND-CP and Circulars guiding the Decree implementation

The WMP approach was to consult with the full range of stakeholders at national and provincial levels and develop a consensus on how to carry out programme activities. The WMP consulted and examined present arrangements for wastewater management with a long list of stakeholders, including central level ministries and, at local level, the relevant departments within the Provincial People's Committee (PPC), as well as the provincial Committee for Industrial Zones, and wastewater and sewerage service companies. Lessons learnt and experiences from other countries and provinces in Viet Nam, and new initiatives are presented to stakeholders, for example the inclusion of decentralized wastewater treatment systems in urban planning.

The WMP and stakeholders work together to develop priorities and practical ways to improve the effectiveness and efficiency of urban wastewater management. For example, PPCs in nine provinces approved the provincial implementation plans, which outline a systematic process for the development of a provincial regulatory framework for wastewater management. Official PPC decisions to approve these implementation plans were issued in the provinces, which indicates a high level of local ownership and helps ensure that outcomes are practical and sustainable. Each province developed its own implementation plan according to prevailing conditions.

The first activity in the implementation plans, and a good example of the WMP's way of working, was the establishment

of provincial orientation plans for urban drainage and wastewater. The aim was to develop a consensus among the members of the PPC on the relevant vision, objectives and solutions.

The local Department of Construction (DOC) was nominated as the lead agency in the PPC-approved implementation plans and is responsible for drafting the orientation plans. The orientation plans include institutional, financial and technical aspects. A range of stakeholders were therefore involved in the drafting process. The DOCs carried out a consultation process so that stakeholders could comment on drafts. The role of WMP was to monitor and support the drafting process, to comment on drafts and to provide advice, but not to write the orientation plan itself. This helped to ensure the orientation plans were practical and sustainable and that local capacities were enhanced in the process. In the nine provinces, the PPCs approved the orientation plans in 2013. During 2016, WMP will support the revision of the orientation plans to reflect the provisions of Decree 80.

A partnership is developed where the WMP teams provide technical assistance to leaders and officials but do not themselves take a role in the planning, preparation and implementation of programme activities. A key factor in the approach is its flexibility. The WMP team regularly reviews methods and approach to carry out activities at national level and in the nine provinces, assess the results and improve them if necessary.

The WMP approach is to help develop the awareness and capacity of leaders, so that they can, in turn, guide and effectively supervise officials who carry out WMP events and activities. In this way the sustainability of technical capacity and new institutional arrangement is improved.

Based on observations, the WMP team regularly provides verbal and written advice on ways to improve methods and outlines for activities, to help resolve problems as they emerge, and to improve the implementation of activities. In this way, local ownership and capacity in wastewater and drainage management is significantly enhanced.

The WMP provides an independent perspective on improving the legal and policy framework, institutional and financial arrangements and technical options for urban wastewater and sewerage treatment and management. In some situations this was effective in defusing tensions between authorities. The WMP team provides clear and concise independent advice based on international best practice, experience across many provinces and analysis of results to guide stakeholders at national and provincial levels. This advice is based on Viet Nam's legal and policy framework and is persuasive and convincing.

Results

As national and provincial leaders and officials become more involved in the WMP programme, their awareness is enhanced about solution options and emerging problems in wastewater and drainage management. For example, awareness was created on the need for a new decree to replace Decree 88 and the selection of guidance and direction on key areas in the sector. WMP's engagement with the range of stakeholders is helping to create an enabling environment so that draft national policies and provincial regulations can more quickly and effectively shift through the steps, procedures and organisations in the approval process.

The involvement of stakeholders from the PPC, relevant departments and the service companies replaces a fragmented approach to wastewater management and stimulated investment based on the advancement of a common vision, strategic planning and consensus on the development of the sector. Previously, the sector suffered from significant fragmentation and investment was based on the principle of *xin cho*: once the funds were finished, work stopped.

During the process stakeholders develop a systematic approach so that key aspects of the system, including technical, financial, organizational and institutional issues, are reformed simultaneously. This helps to ensure more effective budget utilization in the development of the urban wastewater sector and has the potential to increase private and household investment, consequently reducing the need for state investment in a context where resources are limited.

The focus in the participating provinces has been limited to investment in wastewater management in the provincial capital city. This is being replaced by a focus on all urban centres in the province. By involving the range of relevant stakeholders, provincial leaders can much better select the type of technology suitable to local conditions and budget.



The focus on capital investment at national and provincial levels is replaced by a more balanced approach that balances capital investment with allocating funding for running costs.

In the past, and in most other provinces, significant amounts of resources were wasted because of the lack of operation and maintenance. In particular, the lack of proper maintenance means that systems require rehabilitation and replacement much sooner than would be the case if proper O&M was in place. One key outcome of the WMP approach has been to build a consensus to address this issue and to ensure that suitable and sustainable maintenance systems are developed.

The participation of the wide range of stakeholders at national and provincial levels in consultations helps increase their capacities and establish a shared vision on the way forward. The ability that WMP provides to share their perspectives, negotiate decisions and develop effective inter-department communication channels is a key aspect of this process. Practical results in nine provinces include the establishment of provincial regulations for wastewater management, tariff roadmaps for the operations and



maintenance of wastewater systems and lump-sum based performance management contracts between the asset owner and service provider.

Finally in relation to results, the use of pilots and the introduction of initiatives such as decentralized treatment plants are being expanded. This is an essential part of ensuring the momentum, and especially the learning processes, developed under the programme continue into the future.



Training of training course organized by VWSA and GIZ

Awareness raising campaign on wastewater at school



Roundtable on Provincial Regulations on Drainage, Sewerage and Wastewater Treatment and Wastewater Tariffs Roadmap, Lang Son, October, 2015

Considerations for Implementation

One disadvantage with the approach is that it takes time to develop a consensus. Issues need to be presented, discussed and agreed with a range of stakeholders before the planning and implementation of activities can start. In addition the consultation process requires the allocation of more resources for consensus-building and planning. The objective is to replace top-down decision-making with demand driven decisions. Meetings and workshops need to be conducted so that leaders and officials have the capacity to make demand-driven decisions.

The national level and each province have differing strengths and weaknesses in leadership, management styles and capacity, with some stakeholders requiring more assistance. Three provinces that entered the programme at a later stage had special requirements and required more dialogue. These factors need to be taken into account in developing and scaling up the approach that has emerged under WMP.



*Operation and maintenance of drainage and sewerage system in
Can Tho City*

Conclusions and Recommendations

In Viet Nam, line ministries and provincial levels often plan and implement policies according to their particular mandate, which results in a lack of coordination and cooperation with other line ministries - the 'silo' effect. The WMP approach promotes the linkages between stakeholders from national and provincial level, between provincial government departments and with service providers, and the involvement of service users. In this way, the 'silo' effect is diminished and the effectiveness and efficiency of strategic planning and management is improved.

Drainage and wastewater management is not only a technical issue. By considering the development of the wastewater sector a socio-economic development issue, a public administration reform issue and state management and public service issue, the range of stakeholders are engaged to develop a consensus on technical, financial, institutional aspects of the sector. It is critical that these aspects are developed consistently and simultaneously.

A key recommendation that has emerged from the WMP experience is that programmes and projects should be organized to partner clusters of leaders and officials from the government, service delivery company and service users. This would ensure that stakeholders from all levels of government in the sector and the community are engaged and contribute to the systematic planning and development of the drainage and wastewater sector.



Drainage canal in Hanoi

5.3 ADB URBAN ENVIRONMENTAL IMPROVEMENT INITIATIVES

The Asian Development Bank (ADB) has been supporting a program on urban environmental improvements in central Viet Nam, including the Central Region Urban Environment Improvement Project and the Central Region Small and Medium Towns Development Project, which together ran between 2004 and 2014.²⁰ The main concept of these projects was to work decentralized, with provincial government and its delegated agencies, to invest in expanding essential urban environmental management and infrastructure. Most target towns were mid-size coastal towns, subject to drainage and flooding problems because of the flat topography and the impact of heavy rains and seasonal storms; problems that are likely to get worse with climate change. Typically, projects included expansion of water supply systems, improvement to drainage and wastewater networks and wastewater treatment facilities, all supported by community environmental sanitation and awareness. Sustainability of the investments was to be achieved by strengthening local agencies, and encouraging government to introduce or increase tariff for water, wastewater and solid waste management services.



Flooding in Tuy Hoa City, Phu Yen Province

Projects were reasonably successful in their development impact. Environmental conditions improved because of better arrangements for the collection and disposal of solid waste and more effective drainage of stormwater and wastewater from the urban area. Significantly, the project implementation demonstrated the practical challenges with achieving house connections for new sewerage networks, under then prevalent legislation. Some local governments resisted funding or have not had sufficient funding for the tertiary sewerage infrastructure including house connections. For this reason, households are not connected to the system and waste continues to pollute groundwater as well as surface water. As a result, the project's deliverables included wastewater treatment facilities that remained operating at zero or low capacity because the tertiary network link to households had not been achieved at project's end.

The project similarly demonstrated the mixed experience in achieving agreement with provincial government to increase fees or tariffs, for water supply, wastewater and solid waste collection services. In some cases, provinces continued to



High water level in Mekong delta in rainy season

⁽²⁰⁾ Central Region Urban Environmental Improvement Project. Loan number 2034. Loan effective from June 2004 to April 2012. Project Completion Report April 2013. Central Region Small and Medium Towns Development Project, Loan number 2272. Loan effective from August 2007 to June 2014. Project Completion Report Dec 2014.

resist project covenants to gradually increase tariffs towards approaching cost recovery levels.

A critical recommendation emerging from project evaluation focused on the need for ADB to provide institutional support to central and local government, specifically to ensure that wastewater and drainage systems are maintained and operated efficiently. The dialogue with the government on urban service reform should continue, in particular on the application and targeting of government subsidies for sanitation, and the development of more transparent, efficient, and equitable mechanisms for directing such subsidies in public services.

A new approach was employed in Thanh Hoa, as a follow-up for one of the cities of an earlier project. The Thanh Hoa project expanded its scope, driven by objectives of achieving balanced and sustainable socio-economic growth, and in the process bringing together financing instruments from various international sources.²¹ Although the drainage system was improved under the initial project, raw sewage from household toilets and industries mixed with storm water was still discharged into the river, causing serious water pollution and increasing health risks from waterborne diseases. Under the second project, a combined sewer system is being constructed, with pumping stations and a central wastewater treatment pond. When completed, the new system will treat wastewater for the city core. A separate facility will treat wastewater from the general hospital.

With the experience of these integrated urban development projects, ADB has sought to engage with government in a wide-ranging informed policy dialogue on suitable approaches to scaling-up urban environmental improvements. In preparation for such long-term investment, **city sanitation strategies** were conducted in a number of medium-sized towns. These are rapid assessments of urban environmental conditions, needs, as well as institution preparedness in order to arrive at initial conclusions on the type of affordable and high-impact sanitation improvements that may be suitable for the physical and socioeconomic conditions encountered.

An important objective of the studies was to encourage a more flexible attitude to the consideration of wastewater management alternatives. Experience showed that a combination of decentralized and centralized treatment plants frequently offers the most economic solution, but

that local decision makers still tend to prefer conventional centralized treatment options. Local government is concerned about facing objections from residents when planning multiple wastewater treatment plants, expecting the nuisance from odours from the facilities. The Technical Norms No, 07: 2010/BXD require large buffer zones around treatment plants. If such regulations cannot be adapted for small treatment units such as package plants, the buffer zones would render decentralized options uneconomical. Other concerns relate to the perception that decentralized alternatives would require more skilled staff.

The recent regulatory changes in approaches to more flexible discharge standards have clearly not yet resulted in the acceptance of lower and more pragmatic standards by provincial and city departments of natural resources and environment. The concept of a phased and affordable introduction of treatment technology, with the probable impact on effluent quality, will become a crucial point of discussion, in particular for the larger capacity treatment units (> 5,000 cubic meters/day), which require approval by the Ministry of Natural Resources and Environment.

The surveys demonstrated the wide range of **institutional** arrangements for running urban services that had evolved over the years at city level, requiring considerable re-organization and strengthening to meet the needs of resilient urban areas.

For some towns, services are well organized, combining most urban services into one organization, directly accountable to provincial government as asset owner. In others, responsibility is dispersed over a number of agencies, with unclear ownership and accountability, and little transparency. Some water companies do not wish to assume responsibility for any future wastewater management, because of uncertainties on financial and technical obligations and liabilities. The drainage system is in some cases the responsibility of the department of transport, in other cases of a public works company. The quality and reliability of the provision of septic tank desludging services in particular is highly variable amongst cities. There is little demand from households for the service, as preventive maintenance, the quality of the service is not subject to regulation, and final disposal of sludge is frequently not environmentally acceptable.

⁽²¹⁾ Loan 2511 Thanh Hoa City Comprehensive Socioeconomic Development Project.

5.4 CLIMATE CHANGE ADAPTATION IN WASTEWATER MANAGEMENT

The reality of climate change is accepted as a key policy issue in Viet Nam, which as a country has been identified as one of the most vulnerable to the impacts of changing climate conditions. Climate change will have a major impact on all aspects of urban development, including urban water supply and wastewater management services. The utilities providing these services will have to adapt to changing climate conditions and hydrological regimes that will impact on both water supplies and the ability of the environment to absorb waste products. The concept of climate change adaptation can be defined as a process of “adjustment in the ecological, social or economic systems in response to observed or expected changes and their effects and impacts in order to alleviate adverse impacts or take advantage of new opportunities” (IPCC 2007).

The implications of climate change for wastewater management are obvious and potentially severe. Changing rainfall regimes are likely to greatly alter stormwater disposal needs and have clear implications for the ability of riverine systems to absorb and dilute urban wastes that are discharged into them. Increased flood risks are a further challenge, as many wastewater treatment and disposal facilities are inevitably located in low-lying sites. The level of maintenance needed is likely to be higher and changing climatic conditions need to be taken into account in the planning and construction of new wastewater treatment and disposal infrastructure. The ability to adapt to these changes, to become climate change “ready”, is a key challenge for authorities responsible for this sector.

Recent experience in this field was analysed under the US-AID-funded Environmental Cooperation – Asia (ECO-Asia) project. This project developed a climate readiness programme for water and wastewater management utilities from 14 Asian cities, including Ho Chi Minh City. The project conducted a survey to assess existing levels of climate readiness amongst the utilities participating in the project and then developed a consultation process to enhance their understanding of what they would need to do to strengthen their ability to adapt to the impacts of climate change.

The survey found variable levels of climate readiness. Some utilities have taken concrete steps to increase their understanding of the implications of climate change and to develop plans and management systems to address climate impacts. Other companies are just beginning and have a limited understanding of the actions needed to respond to climate change risks. Overall the utilities were aware of the need to develop a better understanding of the impacts on

their operations, and to assess climate-change related risks. They identified the need to manage those risks by integrating practical adaptation approaches into long term strategic or investment plans to ensure delivery of effective services in a changing and increasingly uncertain environment that is a consequence of climate change.

The ECO-Asia report advances a four-stage model of the actions needed for water and wastewater management utilities to strengthen their climate change readiness (see Figure 4.1). The four stages in the model developed under the project are: (1) awareness; (2) assessment; (3) planning; and (4) actions.

Figure 4.1 The Sequence of Stages in the Climate Readiness Process



The report gives a more detailed description of the four stages as follows:

Awareness is an improved knowledge and understanding of climate-related risks by management and staff at the service provider as well as related stakeholders (such local or national governments, line ministries and departments, academic institutions and communities or customers of the providers). Building awareness of climate change impacts and possible adaptation solutions, especially at the management level, is the fundamental first step in the improvement of climate change readiness. In this context, awareness is rather a specific and focused understanding of the implications of climate change for the service provider and stakeholders, especially customers. There are similarities here to the approach developed in the WMP Programme outlined

above, with such awareness most effectively developed through a structured process of stakeholder engagement in analysis and decision-making.

Assessment is the process through which a service provider is able to predict and, over time, improve its predictive capabilities for addressing climate and hydrological changes in relation to potential risks resulting from climate change. Assessment identifies how climate change will affect operations now and in the future. There are always inherent uncertainties in such predictions. The strengthening of assessment capabilities is therefore about reducing these uncertainties. Of particular importance is the extent to which a service provider can define and assess the likelihood of occurrence of specific potential risks from climate change. Risks can include the consequences of permanent changes to background conditions and increased variability in key aspects of these conditions, such as the levels and seasonal distribution of rainfall. Risks can be the result of long-term trends and gradual change or consequent from sudden and disruptive shocks, such as more frequent and more severe extreme events like cyclones and associated floods.

Planning relates to the extent to which the service provider is willing and able to take climate change into account in its decision-making processes, including the preparation of specific climate change adaptation plans and decisions on the configuration and levels of infrastructure investment. This



Flooding in Ho Chi Minh City, September, 2016

covers long-term strategic planning and investment decisions as well as any necessary changes to day-to-day operational planning and maintenance systems, to reflect changing conditions. In a Vietnamese context this must include the provincial-level authorities, as asset owners responsible for long-term planning and investment decisions as well as the companies that are directly operating wastewater treatment and disposal infrastructure. The planning process includes the extent to which the company and provincial authorities have effective disaster management and mitigation plans. Often these plans need strengthening to reflect the increased incidence of extreme climate-induced events such as major storms, floods and droughts.

Actions are activities or interventions that a service provider implements in response to increased risks and changes in environmental (and operational) conditions that are identified in the assessment and planning stages. Utilities and provincial authorities can and do take many types of action in response to climate change. Many relate to securing the future sustainability of water supplies, including physical investments such as increasing reservoir capacities, flood-proofing facilities and accessing new sources of water as well as non-hardware interventions such as watershed management, water demand management and cooperation with other stakeholders in an integrated water resources management framework.



Flooding in Ho Chi Minh City, September, 2016



Ms. Thao Huong – Head of the Wastewater Management Division, ATI spoke about the Decree No. 80/2014/ND-CP

Other actions relate to improving the overall efficiency and effectiveness of the company, including reducing water losses, recycling wastewater and working with consumers in demand management. Actions can relate to risks connected to water quality and wastewater disposal, in particular the construction or improvement of treatment facilities. Finally, actions can relate to decreasing disaster risks through improvements in the overall disaster management system and physical interventions, such as flood barriers and relocating key facilities to higher grounds. The identification of the actions that are appropriate to conditions in individual provinces is a key task that can be effectively integrated into the sort of approach developed under the WMP as outlined above. It is essential that the authorities involved in decisions on wastewater investments and management are aware of and plan for climate change: the consequences of not doing so are likely to be the failure of systems and the waste of investments in the future.



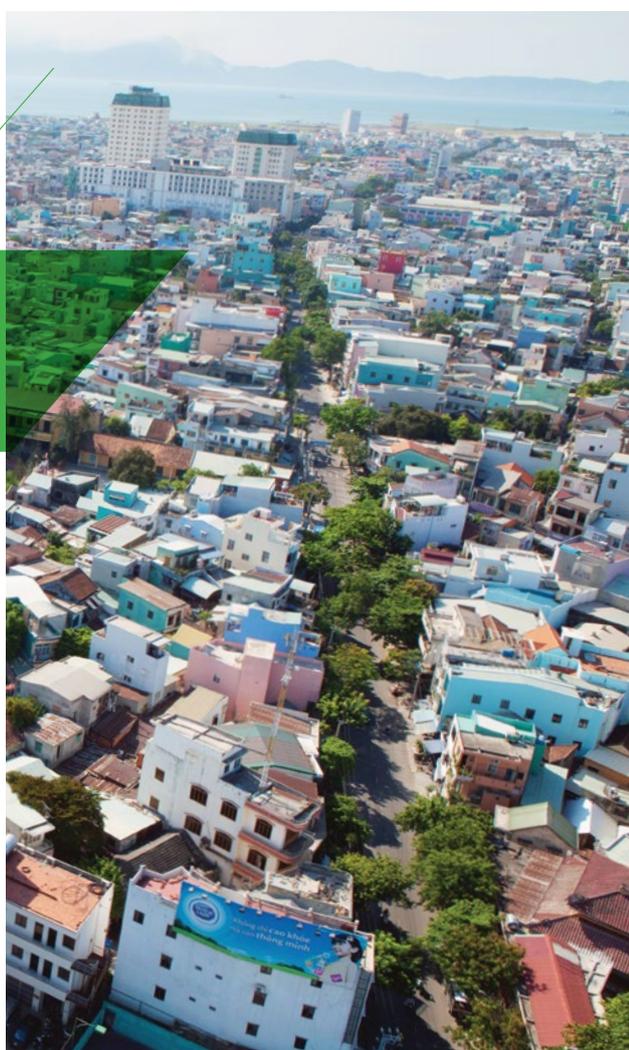
Danang City

The World Bank report on Can Tho used a similar approach (the “City Strength Diagnostic Methodology”) to develop a consensus on the challenges facing Can Tho if it is to develop greater resilience.²² The study identifies flooding and uncontrolled urbanization as the main and linked threats to resilience and states that the poor are especially vulnerable to economic and environmental risks. The lack of coordination between city government departments was identified as an important challenge. The report identifies six “resilience characteristics”: robustness, reflectiveness, redundancy, coordination, diversity and inclusiveness.

⁽²²⁾ World Bank. 2014. *Can Tho Viet Nam, enhancing urban resilience*. World Bank, Washington D.C.

5.5 RESOURCE RECOVERY AND REUSE IN WASTEWATER MANAGEMENT

One issue that is referred to in Decree 80 but with which there is little experience of in Viet Nam is the recovery and reuse of resources in wastewater management. This refers to both the water itself, treated to a state where it is safe for specific uses such as irrigation, and to the materials, principally nutrients, that wastewater contains. These materials have potential value and can be used in a variety of ways, with their application as agricultural fertilizers or conversion into a course of energy the main ones. A recent publication²³ sets out this case well:



Da Nang City

“While water recycling and reuse offer the opportunity to augment water resources, there are other valuable resources that can be recovered, as well. Innovative technologies are available that can transform wastewater and bio-solids into energy, fertilizers and other useful materials”.²⁴

Additional investments in resource recovery and reuse can increase the potential for sustainable cost recovery in the sanitation sector without additional charges to consumers. This will work where effective business models are developed and the private sector is involved to realize the opportunities that this new business presents. The case for this is clear and is growing in an urbanizing world, such as in Viet Nam, where the pressures on resources and the quantities of waste materials are both inexorably increasing.

The approach is premised on strong private sector involvement but also recognizes that this will not happen unless there is a supportive policy and institutional environment and, in the early stages at least, an effective package of incentives that will attract private sector investments into what is a new and unknown business sector. As part of this it is essential that there is a clear definition of rights and responsibilities and that the policy and regulatory framework includes measures to identify and stimulate markets for the materials that are recovered from wastewater.

The economic case for resource recovery and reuse can be very strong. A recent survey in the USA found that more than half of water supply utilities recovered over 50% of their operating costs from the sale of reclaimed water. These economic benefits will only occur, however, where there is a strong business orientation in the operation of wastewater management systems and where sufficient investments in novel technologies are made to make the reclamation of resources feasible. Similarly, a study in six East and South-East Asian countries (including Viet Nam) by the Water and Sanitation Programme found that interventions to improve sanitation and manage wastewater produced net economic benefits in all of the countries studied.²⁵

⁽²³⁾ Drechsel, P., Qadir, M. & Wichelns, D. (eds. 2015) *Wastewater: economic asset in an urbanizing world*. Springer, New York. This publication is one of a series of materials that have been produced on the issue of resource recovery and reuse as part of the CGIAR Programme on Water, Land and Ecosystems. Further materials, including publications, videos, data, manuals and other media, are available on the programme website: www.wle.cgiar.org.

⁽²⁴⁾ Drechsel, P., Qadir, M. & Wichelns, D. (eds. 2015) *Wastewater: economic asset in an urbanizing world* Springer, New York, page 3.

⁽²⁵⁾ WSP. 2011. *A six-country study conducted in Cambodia, China, Indonesia, Lao PDR, the Philippines and Vietnam under the Economics of Sanitation Initiative*, World Bank, Washington D.C.



Delegation from MoC, MPI and Office of the Government to the Department of Solid Waste Management, Malaysia in 2012

Government agencies responsible for regulating the wastewater sector need to appreciate the full economic picture associated with resource recovery and reuse. A study in Viet Nam by WMP categorized the economic benefits from the recovery of wastewater, in addition to the direct value of the materials reclaimed, into the following groups of potential benefits:²⁶

- Reduction of the environmental costs of pollution, citing evidence from several sources that the costs of pollution are the equivalent of around 5% of GDP in Viet Nam and similar countries in Asia.
- Increased land prices in the areas where treated wastewater has been released, with the reduction of pollution significantly increasing the values of land in these areas as noxious materials are removed from the local environment.
- Reduced human health impacts from hazardous materials, including bacteriological and organic contaminants as well as potentially toxic non-organic materials such as heavy metals.
- Increases in revenues from tourism, for cities where this is an important sector, where a reduction of pollution from wastewater is estimated to have the potential to increase revenues by 5%.
- Reduced desludging costs, a long-term benefit as more houses are connected to the sewerage network.

The recovery and reuse of materials from wastewater treatment can therefore result in a combination of direct

financial and indirect economic benefits. The costs of inaction are high: a recent World Bank/AusAID study estimated the combined costs of inadequate sanitation in Viet Nam, the Philippines and Indonesia to be \$8.5 billion per year.²⁷ A related paper showed that, despite the clear costs of inaction, in Viet Nam there are low levels of wastewater treatment, cost recovery is minimal and appropriate policies and incentives to encourage private sector participation are not in place.²⁸ This is despite efforts by the government in recent years to promote improved treatment levels.

The role of the private sector in resource recovery and reuse is a key issue. This can be expressed in the form of public-private partnerships (PPP), an approach that has GOV support (see section 2.7). Setting up such partnerships is challenging, as it requires both an incentives framework for private sector engagement and a supportive administrative and regulatory environment to be in place. A recent example of successful PPP in wastewater treatment can be found from Delhi²⁹, a city with massive challenges in wastewater disposal. The paper outlines the PPP options for Delhi and systematically inventories the benefits that this will bring to the city. An International Finance Corporation paper on the potential for developing sanitation markets in Africa argues “using a market transformation approach, selling sanitation is demonstrating strong potential to unlock new market opportunities”.³⁰

⁽²⁶⁾ WMP. 2013. *Economic impact of the development of wastewater collection and treatment in nine provinc-es/cities*, WMP/GIZ, Hanoi, page 11.

⁽²⁷⁾ World Bank/AusAid. 2013. *East Asia and the Pacific urban sanitation review*, World Bank/AusAid, page vii.

⁽²⁸⁾ World Bank/AusAid. 2013. *Socialist Republic of Vietnam performance of the wastewater sector in urban areas: a review and recommendations for improvement*. World Bank/AusAid.

⁽²⁹⁾ World Bank. 2011. *Delhi Jal Board: wastewater management PPP options study*. World Bank, Washington D.C.

⁽³⁰⁾ Pedi, D. & Davies, W. 2013. *Transforming markets, increasing access: early lessons on base-of-the pyramid market development in sanitation*. IFC Washington D.C. Washington D.C.

The study referred to above argues that “the resources embedded in municipal wastewater generated annually across the globe could theoretically irrigate and fertilize millions of hectares of cropland and produce energy for millions of households”.³¹ They go on to demonstrate that “resource recovery and reuse solutions offer diverse economic opportunities” but that unlocking this theoretical potential in Viet Nam and similar countries faces a number of challenges:



Traffic disorders by flooding on many streets in Hanoi after heavy rains the night May 25, 2016

- **Safety:** safeguarding human health and protecting the environment as the resources in wastewater can be hazardous if not treated properly and desired materials, such as nutrients, can be mixed with toxic wastes from industry, pharmaceutical residues and other undesired materials.
- **Social and cultural acceptability:** the use of sludge, and especially fecal materials, can face social and cultural barriers that will need to be overcome, with stakeholder participation at the earliest possible stage a key step in this process.
- **Appropriate policies and supportive institutions:** the government must ensure that there is an appropriate policy, regulatory and institutional environment to stimulate private sector involvement and create a dynamic but safe sector for resource recovery and reuse.

⁽³¹⁾ Drechsel, P., Qadir, M. & Wichelns, D. (eds). 2015. *Wastewater: economic asset in an urbanizing world*. Springer, New York.

- Financing reuse solutions: most reuse solutions have public good dimensions and generate both private and long-term societal benefits but there is often a need for some level of state support (especially in the early stages of sector development) and incentives to reduce perceived risks in investments in the sector.
- Innovations and future markets: whilst most water reuse approaches can be built on established technologies famil-



Traffic disorders by flooding on many streets in Hanoi after heavy rains

iar to wastewater managers, resource reuse such as energy and fertilizers often involved the introduction of innovative and unfamiliar technologies that will need support to ensure acceptance and the development of long-term markets for their use.

This is a formidable but not insurmountable list of challenges. What is clear is that the development of widespread and dynamic resource recovery and reuse sectors can generate huge immediate and long-term economic benefits. Creating these sectors will require a strong partnership between a range of actors, including both central and provincial government agencies and the private sector. Vigorous action by the lead government institutions responsible for the management of wastewater is needed if this is to happen.

6.1 OVERVIEW OF INVESTMENT NEEDS

The World Bank has estimated that infrastructure needs in Viet Nam amount to \$ 100 billion in the next five years. For urban wastewater management, estimates from various sources put investment needs at anywhere between \$10 billion to \$20 billion, depending on the coverage and the level of wastewater treatment proposed.³² It is clear that the current financing mechanisms for urban infrastructure will not be able to meet these needs, even with considerable loan financing from the major international finance institutions. Past investment in new urban environmental infrastructure in recent years totalled around \$200 million per annum, whereas the draft National Investment Framework for sanitation under preparation by the Ministry of Construction estimates annual requirement for the next ten to fifteen years to about \$800 million. Upgrading drainage and flood management measures to make coastal cities more resilient to climate change impact will further add to these investment needs.

New sources of financing, and new mechanisms for financing, will be required to fill this gap. In early 2015, government

adopted two new items of legislation intended to encourage private sector investment in infrastructure, on public investment and on public private partnership.³³ Whether these will be effective in attracting new international private finance in the present business environment still needs to be demonstrated. There are concerns that the government's ambiguous position on state owned enterprises, which are allowed to bid on PPP contracts despite the government's stated aim to reform them, will deter international financiers from entering this market. The reform of state owned enterprises has been claimed as a priority of government for many years, but the effective rate of change has been slow.

Additional sources of funding that need to be (and are being) explored are (i) local government financing, including expanding the potential for sub-national borrowing; (ii) property tax; and (iii) the role and potential of new international finance institutions.

6.2 GOVERNMENT CHANNELS – FINANCING URBAN INFRASTRUCTURE

Subnational government is responsible for expanding and improving urban infrastructure to meet government standards and targets, as defined in the respective decrees and supporting directives. However, this responsibility is not necessarily matched with the financial resources or the budgetary authority to raise sufficient capital for investment or for sustaining operational costs, including regular maintenance.

The government's intention is that urban water supply should be self-financing, whereby water companies can raise sufficient revenue not only to cover recurrent costs for operation and maintenance but also for replacement, financing and capital investment of expansion of the system. By extension, urban wastewater management systems were also proposed to be operated on full cost-recovery principles, using the service charges that operators could levy under existing legislation. However, it has become clear that this

is not realistic, and that a considerable subsidy is required, initially also for operating costs. This realisation is reflected in the latest key legislation in the sector, Decree 80.

Local government financing in Viet Nam

Provinces receive their budget from central government based on criteria agreed by the National Assembly, expressed in an equitization formula. The strategic national socio-political objective of this formula is to ensure that all provinces can benefit from the nation's wealth creation. Certain provinces, well endowed with natural resources or investment in industry, therefore contribute significantly to the State budget whereas the poorer provinces, such as the northwest, are net recipients of these fiscal transfers to help them reduce poverty levels and improve on basic services. In turn, provinces allocate their budget to cities and districts on an annual as-needed basis.

⁽³²⁾ For instance \$11.5 billion estimated by JICA for 2025, in JICA. 2015. *Local Water supply and wastewater sector survey*. Hanoi.

⁽³³⁾ Law on Public Investment 49/2014/QH13, passed by National Assembly June 2014, effective from January 2015. Decree on Public Private Partnership 15/2015/ND-CP, issued February 2015, effective April 2015.

BOX 2

SOURCES OF LOCAL GOVERNMENT FINANCING³⁴

The Budget Law (2003) stipulates three types of revenue sources for the state budget:

1. revenues assigned 100% to central government,
2. revenues assigned 100% to local governments, and
3. revenues to be shared between the central and local governments.

Sources of revenues assigned 100% to the central government include export and import taxes, VAT and excises on imports, taxes and other revenues from the petroleum industry, and corporate income tax on enterprises with uniform accounting.

Sources of revenues assigned 100% to the local governments include land and housing taxes, natural resources taxes excluding those on petroleum activities, license tax, land use rights transfer tax, land rent, revenues from the leasing and sale of publicly owned houses, registration fees and most other fees and charges.

Sources of revenues to be shared between the central and local levels include VAT (excluding VAT on imports), corporate income tax (excluding corporate income tax

on enterprises with uniform accounting), income tax on high-income earners, special consumption tax on domestic goods and services, and gasoline and oil fees. The rates for sharing revenues between different levels of governments are not fixed by the Budget Law. The Standing Committee of the National Assembly is to decide the sharing rates between the central and provincial governments for each period of three to five years. The sharing rates are uniform for all shared taxes for each province, but they differ by provinces. Revenue sharing rates among local levels are to be decided by the provincial People's Councils.

In addition, communes, district towns, towns and provincial cities may mobilize voluntary contributions from organizations and individuals for investment in infrastructure construction in the locality. The provincial People's Councils have the power to decide on the collection of people's contributions. Revenues from such contributions are not adequately covered by official budget documents, although the Law requires that all state budget revenues including contributions by organizations and individuals must be fully accounted for in the state budget.

⁽³⁴⁾ Source: United Cities Local Governments: Country Profile Viet Nam. A new budget law has been accepted but will not take effect until 2017.

This process of annual budget allocation creates obstacles for long term investment planning to meet strategic development needs. Few urban governments in Viet Nam have reliable access to regular financing, whether for capital investment or recurrent expenditures for operation and maintenance. For the planning and development of major infrastructure such as city-wide drainage or sewerage scheme, local government needs to be able to rely on medium term budgetary commitments in order to fund a multi-year construction and installation programme. In practice, under present conditions such assurance for the availability of investment capital for non-revenue generating projects such as sewerage will only be provided with programmes receiving significant funding from ODA.

Urban infrastructure financing options in Viet Nam today can be summarized in five categories.³⁵

(i) Bond issuance is the most prominent source of debt financing; to date only used by HCMC, Hanoi, Da Nang and Dong Nai Province.

(ii) Lending by the commercial banking sector to sub-national government is rarely used.

(iii) Local Development Investment Funds, as special finance institutions, have been created at provincial level to mobilize capital and invest in local infrastructure. The HCMC Investment Fund for Urban Development is the most successful. Another 28 or more provinces have established LDIFs, but at a much smaller scale.

(iv) Private sector participation in infrastructure is not attractive, because of the need for an often unknown level of subsidy to make them viable; because of insufficient feasibility preparation before being let out to bidding; and because most PSP projects to date have been undertaken without full competitive bidding, increasing the risk of poor outcome.

(v) Use of land for infrastructure funding through Build - Transfer, which is often not transparent, is not sustainable and which distorts land markets.

Two significant factors limit investment in urban wastewater management schemes. One is specific to sanitation, sewerage and drainage. The second is more generic and affects the funding of other municipal infrastructure as well.

(i) Few local authorities recognise the need to invest in urban sewerage schemes as a priority. The economic benefits of better public health and improved water security are not very visible and are consequently poorly understood.

(ii) Viet Nam has made considerable moves towards fiscal and administrative decentralization. Greater autonomy for sub-national government has given provinces and cities significant decision-making powers on public finances and infrastructure development. This autonomy is not necessarily matched by analytical or administrative skills, or by adequate accountability. Investment decisions are often driven by administrative considerations, to generate revenues or to compete with other provinces. Provinces are at times making irrational choices about wishing to invest in infrastructure such as international airports or ports.

As a result, local government, provinces or cities, may not necessarily follow central government policies, or take rational decisions when it comes to prioritising investments. National priorities are therefore politically complex to enforce, such as where applying limited grant or concessional loan funding available in those river catchments where water security is becoming a real threat.

A consistent and equitable framework for local government revenues, budgeting, is still a long way off. The strategic development focus therefore needs to include local government financing, and strengthening awareness in the broader issues surrounding water security, public health and climate change resilience.

⁽³⁵⁾ World Bank AusAid. 2013. *Assessment of the financing framework for municipal infrastructure in Viet Nam*. Washington DC.



Workshop on guidelines for integration of flood proofing management in urban planning

6.3 POTENTIAL FOR PRIVATE SECTOR INVESTMENT

The water sector in Viet Nam has not yet attracted much international private sector interest. Uncertainty continues about the ownership and condition of assets. Information about the location, functioning and present value of infrastructure assets is difficult to find. Ambiguity persists on responsibilities for operation and maintenance. Accounting procedures are not consistent with international accounting standards. Contracts are overruled by force majeure and changes in legislation. Water companies may have little experience in dealing with (or respecting) international style contracts, including performance-based contracts. Investors will have little confidence in secure sources of income because of tariffs that are still low, and uncertainty about local government's capability to subsidize the funding gap.

Despite the adoption of the new decree on PPP, the principal obstacle to increased PPP infrastructure investment is the effort in bringing viable projects to market. This reflects obstacles in the project preparation phase including lack of expertise and capacity within government, an inadequate legal framework for PPPs, uncertainty regarding concessions and take-off agreements, extended and often unclear licensing and permitting processes, and difficulties with land and right-of-way acquisition. Preparing a transparent pipeline of bankable projects in urban water infrastructure requires

government to allocate funding for viability gap financing for pro-poor PPP projects, to make them commercially viable over the long-term. MOC should develop standardized documentation for PPPs, to facilitate the negotiation of individual deals. Finally, the use of the PDF—to fund and facilitate the pre-investment activities of potential PPP projects, including undertaking the pre-feasibility and feasibility studies and developing a robust pipeline of viable and well-structured PPP projects—must be accelerated. ADB has provided significant support for the development of the PDF.⁶⁶

In this context, recent experience of the process of equitization of water and wastewater companies has raises concerns on reasonable transparency in the process of acquiring major stakes in state-owned water companies or, related, the process of competitive tendering for water service contracts. Unless effective and truly independent regulation is in place, a state monopoly may well transition into an oligopoly dominated by a very limited number of well-networked corporations, operating throughout the country. Protection of consumers' interests, and of the state of long-term infrastructure assets, will have to be ensured through carefully worded performance contracts that are independently monitored.

⁶⁶ ADB.2015. *Mobilizing Private Sector Finance to Fill Viet Nam's Infrastructure Financing Gap, 2016-2020 Viet Nam Development Partners Forum on PPP*. Hanoi.



6.4 MULTI DONOR INVESTMENT FRAMEWORK

Against the considerations expressed above, a new framework of development collaboration is proposed, to assist Viet Nam in realizing its targets in urban environment management, and in meeting climate change resilience objectives. Such an investment framework aims to mobilise and leverage considerable capital to fund the large-scale expansion of priority environmental infrastructure. Simultaneously it aims to encourage governance changes in local government financing that will make such investments sustainable and affordable in the long term future.

The proposed scope, scale and duration of this program is considerable. It is expected to be supported through complementary programs by all major development partners, through a consistent set of objectives and a common policy basis, with sufficient operational flexibility to allow for the inevitable different mandates, processing procedures and timelines. Only such a combined and consistent donor initiative will create sufficient leverage for change, to introduce governance reform in an area in which it is difficult to achieve sustainable change.

The duration and planning horizon of the program is about ten years, to allow for several full cycles of planning and budgeting, design and implementation, and to achieve real and lasting institutional impact.

The scope of the program includes institutional strengthening and change to support the ongoing process of decentralization in urban decision-making, budgeting and administration. This will be developed in concert with a capital investment program that will be supported by appropriate sources of loan and grant funding, aimed at leveraging additional private sector investment.

The institutional component should include urban governance and planning, management, finance, and skills enhancement. It will need to refer to the government's ongoing initiative towards a national urban development strategy, reflecting in particular its implications with regard to the planning of infrastructure and service delivery.

The environmental infrastructure and services to be improved under such an initiative will include primarily drainage and flood control, urban sanitation and wastewater management, solid waste management and industrial waste management within the context of urban resilience and Green Cities approach to develop economic (competitiveness), social (equity) and environmental (Green) infrastructures, in line with ADB's Urban Operational Plan 2012 -2020.

The main features of such an investment framework are as follows.

- Multi-donor, with parallel financing: consistent policy base and relevant related covenants, but flexible implementation schedules. Agreements on regional distribution.
- Request-based project lending. Applications for funding of infrastructure improvement originate from local government, supported by pre-feasibility studies. Applications are assessed against a previously agreed matrix of selection criteria, representing policy objectives. The matrix will include mandatory criteria (which are essential in order to obtain funding) and optional criteria (which can put the project owner on a fast-track to obtain funding under the program).
- Investment linked to **urban governance milestones**; following from the national urban development strategy.
- Performance monitoring based on **national system of safeguards** and procurement.
- Part of the funding is likely to be **output-based** or results based, linked to performance indicators, with **fiduciary risk protection** mechanisms to satisfy development partners' mandates and procedures.
- Program used to leverage policy change (through a policy matrix with selection criteria), and encourage the establishment of **municipal development funds** (or similar); investment funds to be channeled through such revolving funds.
- Capacity development of **urban local government** in urban planning and management, development control, local government finance, including medium term budgetary and expenditure frameworks.



Workshop on guidelines for integration of flood proofing management in urban planning

This report reviews how to create healthy and resilient cities in Viet Nam, with a focus on recent changes to wastewater management in urban areas. The overall conclusion is clear: the conditions exist for the development of the wastewater sector in a way that will contribute to urban resilience and will reduce risks to the health of people and to the environment, in and around cities. In this approach, the wastewater sector is seen as the entry point to the development of a wider process of urban resilience rather than just a sector on its own. The realization of this potential will require a sustained effort at national, provincial and municipal levels with different actors working together in a coherent and flexible manner.

Building healthy and resilient cities from the existing starting point will not be easy but it is achievable, producing substantial economic, social and environmental benefits to communities, cities and the country as a whole. It necessitates higher levels of coherence and coordination between the policies and strategies of government agencies across sectors and between local and central governments. It was shown in chapter 1 that strengthening resilience is inherently multi-sectoral and must be linked to a wider process of institutional and governance reform.

For the wastewater sector, a sustained effort of investment and institutional reform is needed to ensure higher levels of efficiency and of financial and operational sustainability and to make the management of infrastructure more transparent and accountable to consumers. Capacities and skills throughout the sector need to be strengthened, to bring standards of planning, management and maintenance in line with the best international levels. New financial mechanisms are needed to attract investments and ensure the sustainability of service provision.

Urbanization in Viet Nam is part of a wider process of transformation that has seen the country move from being largely rural with only limited connections to the outside world in the late 1980s to a growing industrial and economic powerhouse that is becoming integrated into the world economy. Millions of people have moved to cities, learning new skills and developing new patterns of consumption and expectations on service provision. Viet Nam's legal and administrative systems are still adjusting to these far-reaching social and economic changes. Systems were based on a rural society and a centrally-planned economy and are not necessarily suited to the demands of a dynamic, urban-based and internationally-oriented economy. The need for changes in the ways the society and economy are

administered and services are provided has been recognized in recent legislation, including the wastewater sector under discussion here.

Industrialization, becoming part of the global economy, and urbanization has helped to push back poverty and has brought countless opportunities. But it has also created new threats, new risks. The rural-urban migration has created areas of high-density urban living. Urban society, increasingly with middle class features, is characterised by high resource use and throughput. This is resulting in an increased production of waste and by-products, the release of which is exceeding the natural self-cleansing limits of the environment. Together these factors aggravate the risk of the spread of communicable diseases and the exhaustion of resources.

These new challenges need to be met by more flexible, responsive and resilient planning and management systems that are able to meet new and higher standards of service provision and environmental protection. The risks associated with climate change, variations in the global economy and other factors place additional demands on these systems that must be resilient to future shocks and uncertainties.

The Government of Viet Nam has demonstrated a commitment to plan and manage urbanization sustainably and efficiently. Legislation is the starting point: a sustained program of actions needs to put the approaches set out in the legislation into practice. A continuing policy and planning dialogue is required with stakeholders at national, provincial and municipal levels, who need to be involved in the sector's future development. This needs to be accompanied by continued efforts to strengthen institutional links and the policy framework for establishing a process to build healthier and more resilient cities that reflect local conditions, challenges and opportunities in the different parts of Viet Nam.

Policy response. At the highest level of policy, Government's response is guided by the new Socioeconomic Development Plan 2016 – 2020. The four broad headings of the coming SEDP aim for institutional reform towards market reform, with a greater role for the private sector; for mitigating social risks of structural reforms and transformation; for the strengthening of fiscal systems and managing decentralization; and, as in the previous SEDP, for environmentally sustainable growth.

Using these policy headings as guidance, the conclusions are evident for determining a relevant strategy for the urban

wastewater and environment sub-sector, and for the nature of donor support. Agencies that are made responsible for wastewater management will need assistance with full equitization, and support with the introduction of business principles. Effective and sustainable provision of environmental services will contribute to a more equitable access to improved urban infrastructure and services, which should benefit greater segment of urban population, and will improve public health. Financially sustainable urban services, as a component of strengthened urban local government financing, will contribute to the process of fiscal and administrative decentralization. And finally, the effective management of urban waste will reduce the threat to essential resources.

Directed by these government development strategies, a coordinated role by an integrated donor community in this sector may be a mix of components or elements. Investment in infrastructure (by the main international finance institutions) may be used strategically to stimulate further spending on infrastructure, assist local government in generating local revenues, and give access to or encourage private sector involvement in role of management and investment.



The police is regulating the traffic in Hanoi after heavy rain



Flooding in Dong Hoi, October, 2016

Various supplementary activities are critical to ensure the sustainable impact of investment, with possible roles for specialized bilateral development partners. New types of data will need to be used, and used differently, to provide a fact-base for planning, prioritization and design. Data are essential to improve awareness, to demonstrate priorities and urgency. Data on public health, building on recent concerns about outbreaks of dengue and gastroenteric diseases, and data on dwindling resources, will need to be assembled and presented strategically to validate the need for critical interventions.

Investment further needs to be complemented by efforts at institutional strengthening to support decentralised government and the provincial planning processes, to create a framework for sustainable financing of urban services, in particular aimed at local service providers, and to create access to private sector participation. Changes will be required to the legal framework and its detailing and application, such as the urban planning framework, the enhancement of local revenues and local infrastructure investment funding, expanded local budgeting and the introduction of concepts of multi-year investment and expenditure frameworks.





Da Nang City

A comprehensive and coordinated response that includes targeted institutional reform can help to expand investment in wastewater infrastructure into a program of creating resilient cities. Resilience in this context refers to an ability and capacity to respond constructively to unpredictable changes in geo-physical as well as social and economic conditions. This requires an adaptation of management systems and procedures, of organizations and of skills.

Combining these elements of consistent and focused policy dialogue, two complementary broad based investment and institutional support programs can be envisaged and are currently under development with ADB support: (i) an Urban Climate Change Resilience Program, focusing on urban planning, governance and green city development; and (ii) Resilient and sustainable urban water supply and environmental sanitation program.

The concept guiding both programs is to support Viet Nam in making the future growth of its cities more balanced and environmentally sustainable, more resilient to the uncertain impacts of climate change, and the demands of a global economy.

The two programs can be designed to enable a multi-donor funding basket, building on continuing donor coordination for the sub-sector. The scope of the program may include institutional change, to support the ongoing process of decentralization in urban decision making, budgeting and administration, in concert with a capital investment program that will be supported by appropriate sources of loan and grant funding, aimed at leveraging additional private sector investment. The institutional component may include urban governance and planning, management, finance, and skills enhancement. Capital investment in environmental infrastructure and services to be improved will include primarily drainage and flood control, urban sanitation and wastewater management, solid waste management, and industrial waste management.

Developing such a comprehensive process of investments and changes to urban planning and governance is, as has been said, a long-term process involving multiple agencies at local and central levels. This process of change has been initiated by recent government initiatives in policy and legislation and reflects the experiences of the pilot programs discussed above. It will need to be planned carefully with a sequence of supporting activities to raise awareness, build a consensus on the trajectory of change and stimulate an attractive investment climate.

The starting points for this process should contain the following activities:

- The development of the investment framework outlined in chapter 5, involving discussions and agreement between the Government of Viet Nam and a group of interested international development partners.
- Establishing a policy matrix that outlines the existing policy context across multiple sectors and identifies essential policy and institutional reform for the urban sector.
- The development of project selection criteria, including a mix of mandatory criteria (which are essential in order to obtain funding) and optional criteria (which can put the project owner on a fast-track to obtain funding under the programme).
- The initiation of an awareness and assessment program that enhances the understanding of provincial and municipal authorities of the nature of and challenges associated with strengthening urban resilience.
- Linked to this, the development of a resilience assessment methodology for provincial and municipal authorities, supported by a national level urban resilience assessment that establishes the key challenges and opportunities related to the development of urban resilience in different parts of the country.

Taken together, this group of activities can be initiated in a relatively quick time frame and without the need for large investments. They will build on the existing momentum established by recent reforms and improvements to understanding and provide the basis for the establishment of a long-term process of urban resilience investments and reforms.

PART TWO: CLIMATE RESILIENCE IN VIETNAM: AN ASSESSMENT IN METROPOLITAN REGIONS

1. SETTING THE SCENE – GROWING METROPOLITAN REGIONS

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 both a need for and improved opportunities to develop greater adaptability and resilience in the management of cities and their surrounding regions.

A recent GIZ³⁷ 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” (page 5)

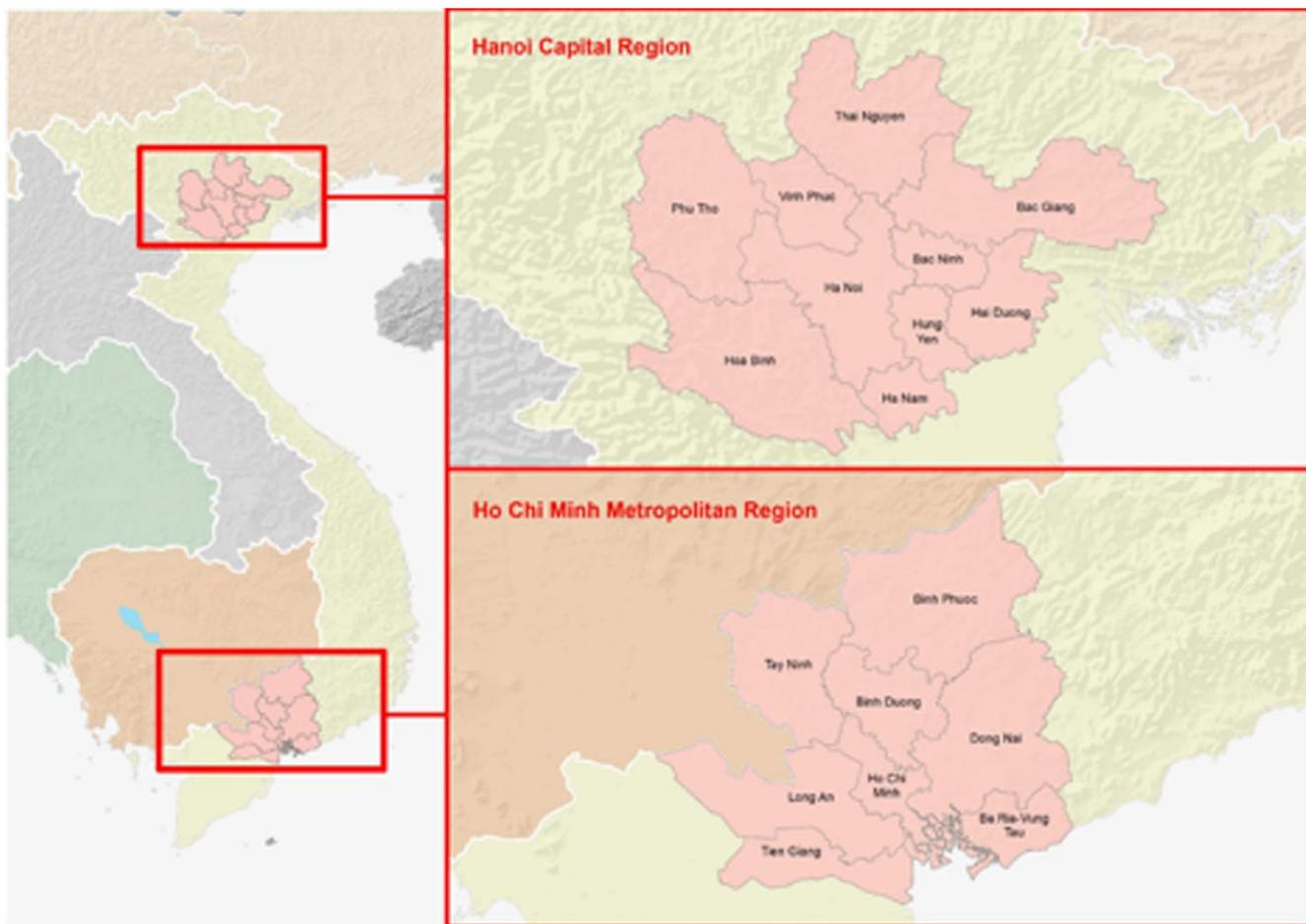
As such, the concept of a Metropolitan Region includes both a geographical element, a city and surrounding areas with which it is closely connected (in some cases demarked by a group of administrative areas such as districts or provinces), and a functional element, the area within which certain specified 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.

⁽³⁷⁾ Rosenzweig, C., Bader, D. & Ali, S. (2014) **Enhancing Climate Resilience in Metropolitan Regions** GTIZ Discussion Paper, GIZ Bonn

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/QĐ-TTg dated May 5, 2008 to include Hanoi city and, originally, 10 provinces, which became nine 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 24.314,7 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.

Figure 1: Metropolitan Regions in Vietnam



Similarly, Ho Chi Minh City Metropolitan Region (*Vùng đô thị Thành phố Hồ Chí Minh*) is a Metropolitan Region proposed by the Ministry of Construction in June 2008. It 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



Hanoi Capital City

rather than having a new over-arching 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.

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 region³⁸ 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 area³⁹. 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 years.

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 period⁴¹.

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 poverty⁴². 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.

⁽³⁸⁾ Thanh Tien News 13th July 2016

⁽³⁹⁾ Voice of Vietnam website **Vietnam urbanization seeks sustainable growth** 11th January 2017.

⁽⁴⁰⁾ Worldometers website 21st September 2017.

⁽⁴¹⁾ ASEAN website 20th September 2017

⁽⁴²⁾ World Bank website **The World Bank in Vietnam Overview** 13th April 2017

2. 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 events⁴³, 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 period⁴⁴. 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 billion⁴⁵. 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



Dr. Dirk Pauschert discusses with Mr. Phan Xuan Dung, Chairman of the Committee for Science, Technology and Environment of the National Assembly on cooperation plan in the FPP Phase 2

⁽⁴³⁾ Luu, 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.

⁽⁴⁴⁾ Reuters 8th September 2012, quoting Prime Minister Nguyen Tan Dung's presentation at a conference on food security and climate change in Hanoi.

⁽⁴⁵⁾ www.preventionweb.net (2017) **Vietnam Disaster and Risk Profile**



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

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 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 2014⁴⁶. Their frequency has increase, 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.

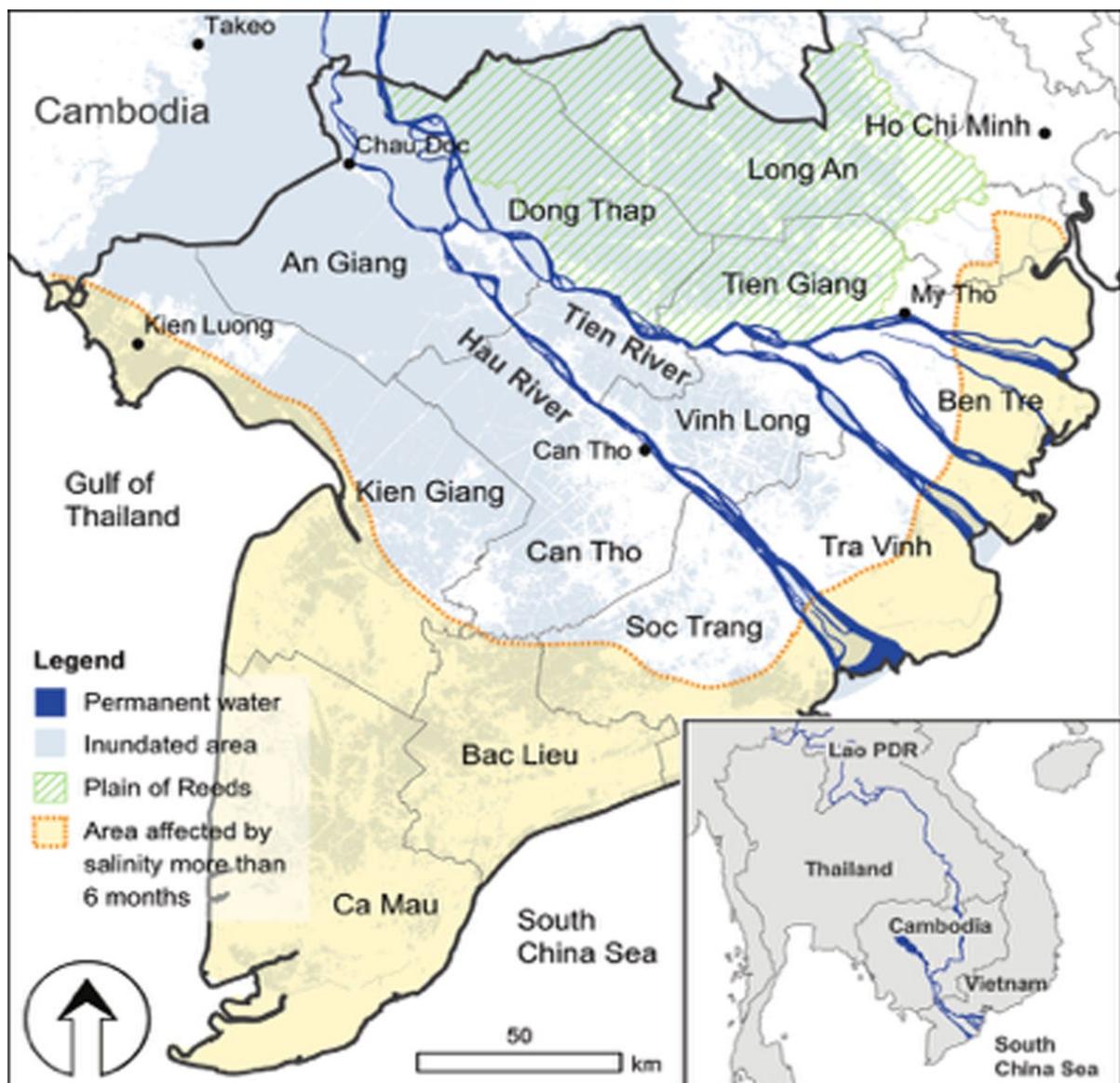
⁽⁴⁶⁾ Luu, C. et al (2017) **Analyzing flood fatalities in Vietnam using national disaster database and tree-based methods** Natural Hazards and Earth Systems Science Discussions, Journal of Natural Hazards and Earth Systems Sciences 12 May 2017.

⁽⁴⁷⁾ Reuters report 29th November 2004

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.” 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.

Figure 2: The Mekong Delta⁴⁸



⁽⁴⁸⁾ Source: Kakonen, M. (2008) *Mekong Delta at the crossroads: more control or adaptation?* *Ambio* vol 37 no 3, pages 205-211, June 2008

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 reflects this. In 1996, flooding in the Mekong Delta killed 180 people, submerged or damaged nearly 800,000 houses, and ten 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"*.

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.



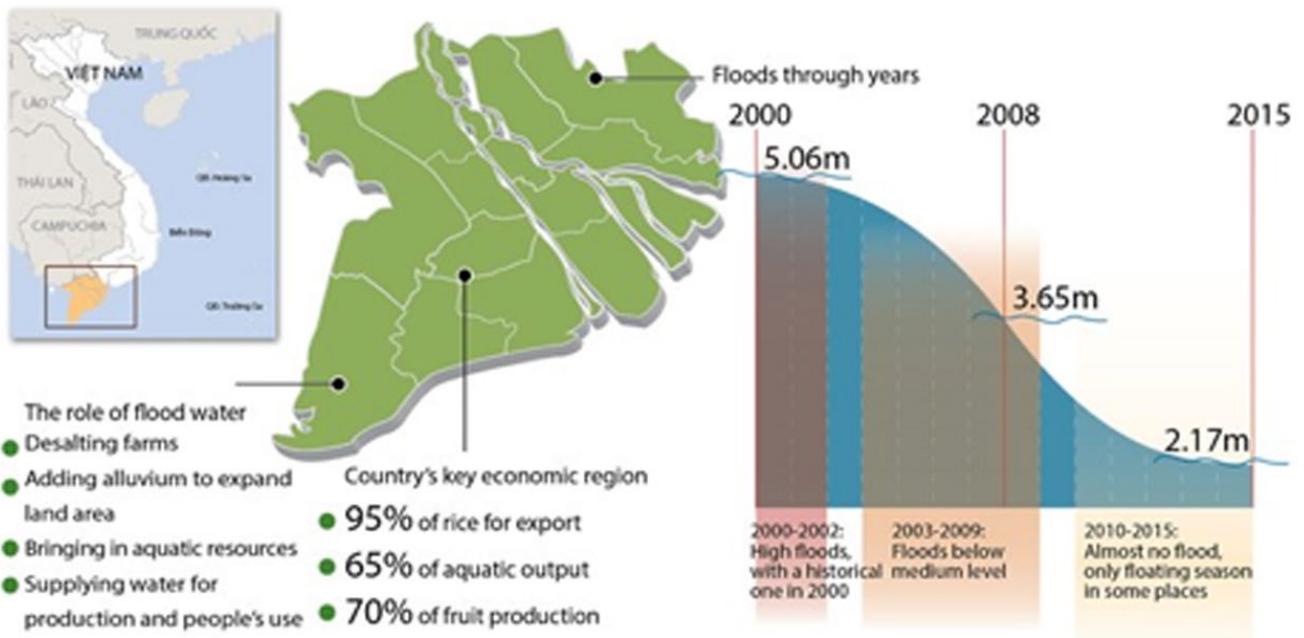
Floods reaching the second floor in a residential area in the Philippines

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 3: Riverine Floods in the Mekong Delta

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.



Source: The Department of Natural Disaster Prevention and Control-Ministry of Agriculture and Rural Development; The Mekong Delta Development Research Institute.

<http://infographics.vn>



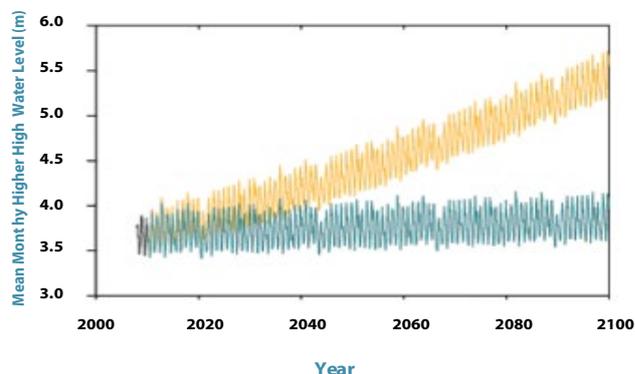
Land subsidence is a major and increasing problem in the Mekong Delta, most of which is only 1-2 meters above sea level. A recent study showed that many areas are sinking at a rate of between 1-3 cm per year and a large part of the delta has sunk between 25-35 cm in the past 25 years⁴⁹. The paper argues 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.

Saline intrusion is an increasing problem. As figure 5⁵⁰ 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 2015⁵¹. 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. There have been several statistics on the economic cost of the drought but according to the Ministry of Agriculture and Rural Development, the economic cost for the drought and saline intrusion in the Mekong Delta is estimated at VND 7,900 billion⁵².

Figure 4: Predicted Sea Level Rises in the Mekong Delta



Constructed sea-level rise scenarios under climate change for an emission case for an Intergovernmental Panel on Climate Change model plus a net subsidence of 9 millimeters per year (yellow) in contrast with the historical custody condition without climate change (blue) and rectified to the contemporary tide record (black) at Vung Tau, VietNam.

Figure 5: Saline Intrusion in the Mekong Delta

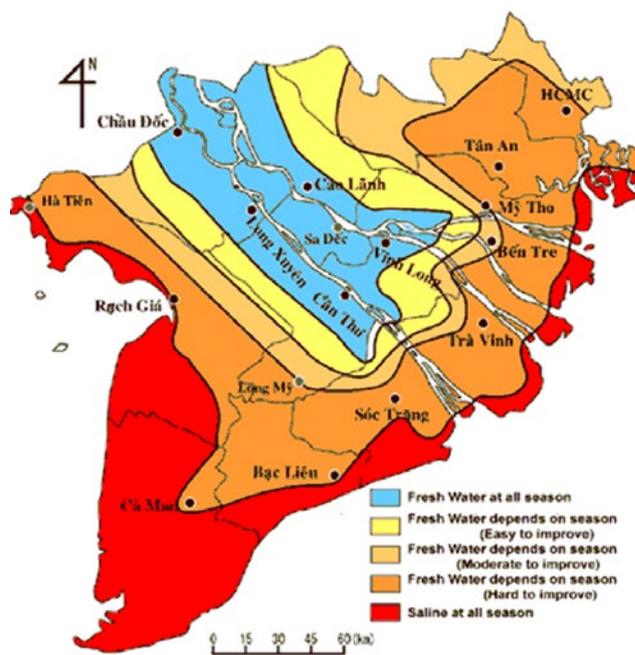


Fig. Status of saline intrusion in Mekong Delta

⁽⁴⁹⁾ Utrecht University website (2017) article from the Urbanizing Deltas of the World programme dated 1st June 2017.

⁽⁵⁰⁾ Akira Yamashita (2017) **Flood in the Mekong Delta** Can Tho University, Department of Environmental Management and Natural Resources

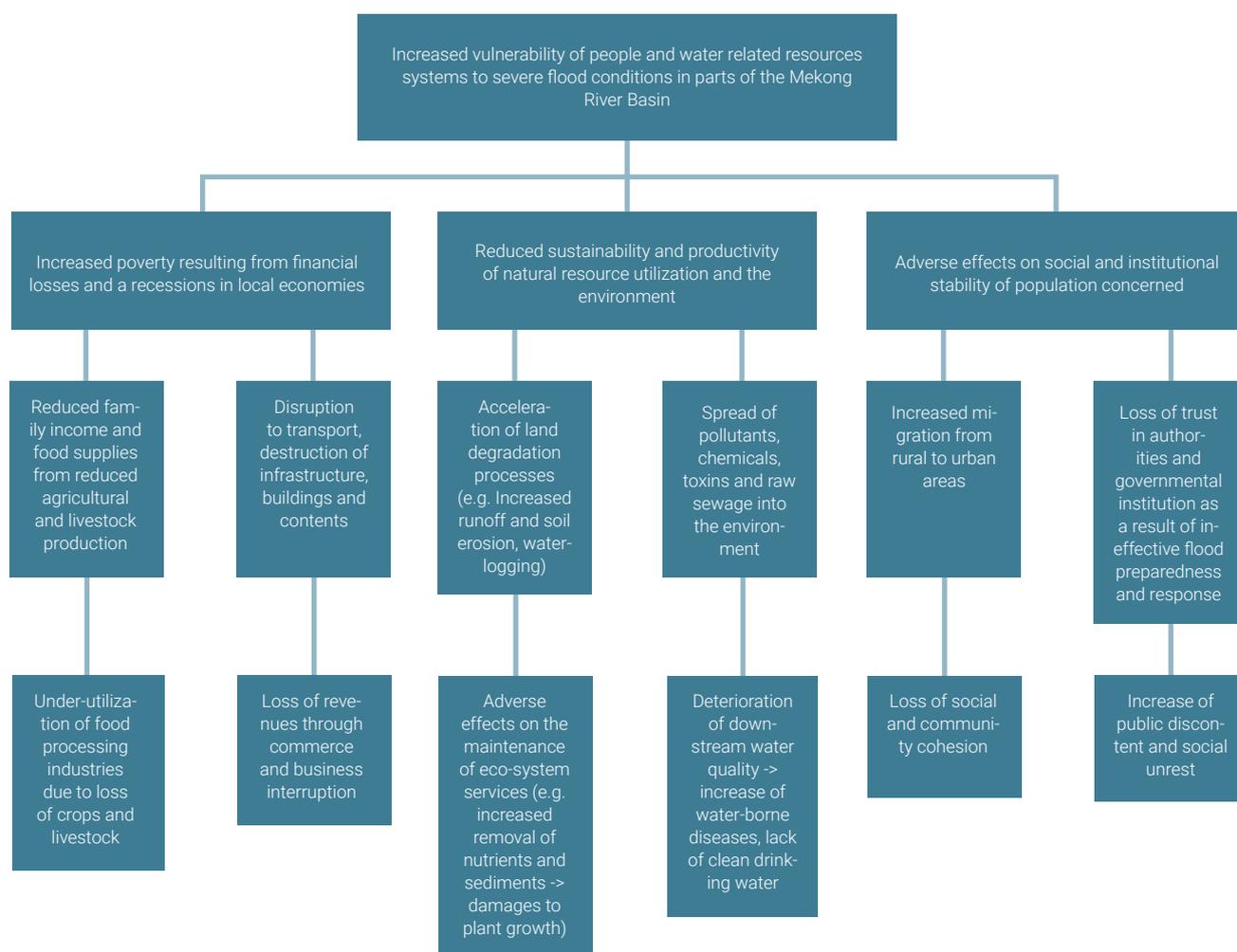
⁽⁵¹⁾ Tatarski, M. (2016) **Mekong Delta drought wreaking economic havoc** AECNews.com March 28th 2016

⁽⁵²⁾ Report No. 2063/TCTL-QLCT dated 29 November, 2017 by the Directorate of Water Resources, MARD

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 6⁵³ 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 6: Potential Effects of Increased Flood-Related Vulnerability in the Mekong Basin

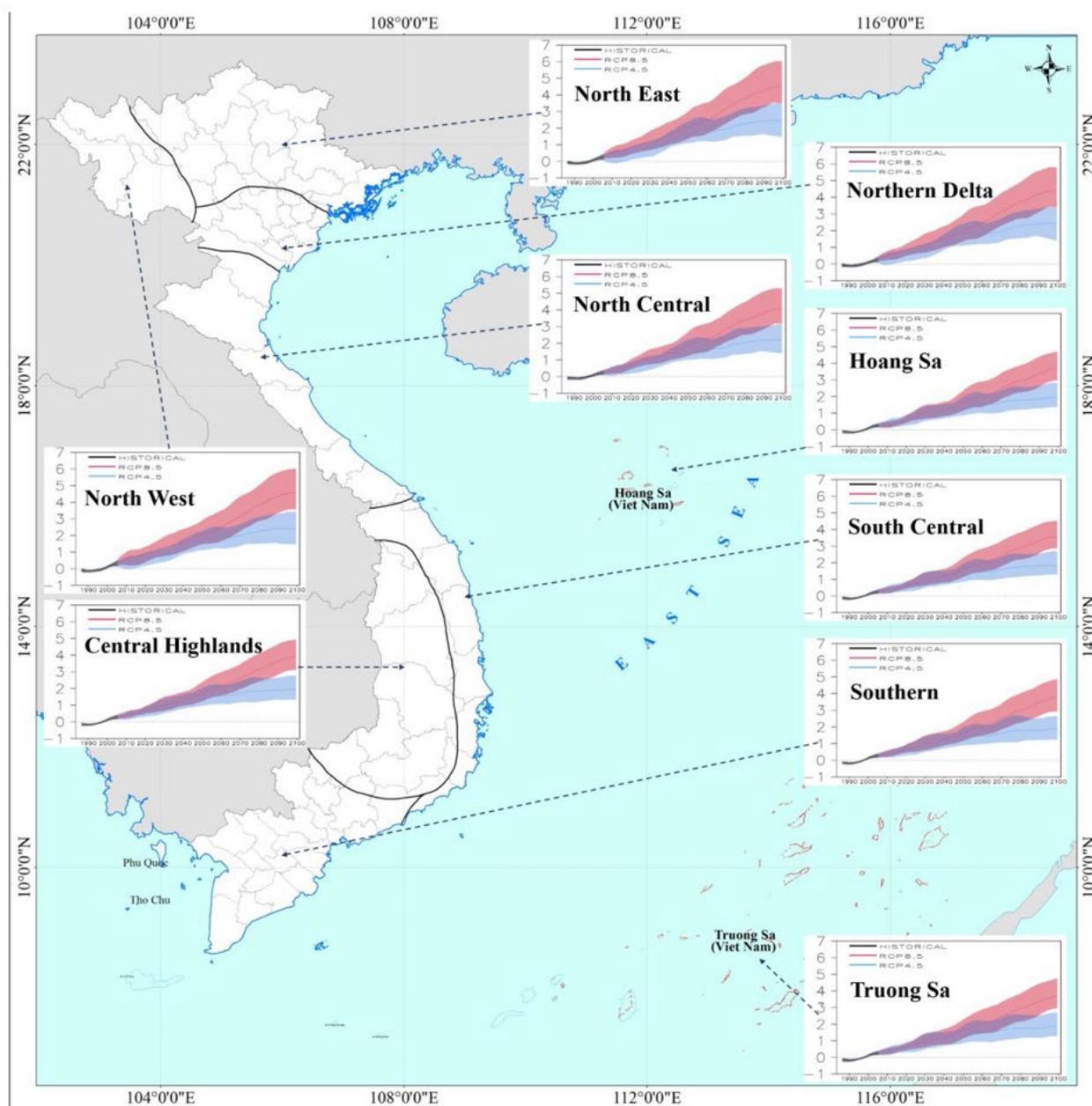


⁽⁵³⁾ Ribbe, L. et al (2013) **Comparison of key drivers regarding their significance for hydro-meteorological extremes and their impacts on selected hotspots in the Mekong River Basin** GIZ, Bonn

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 scenarios⁵⁴ 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.

Figure 7: Predicted Temperature Increases in Different Regions of Vietnam



⁽⁵⁴⁾ MoNRE (2016) *Climate Change and Sea Level Scenarios for Vietnam* Ministry of Environment and Natural Resources, Government of Vietnam, Hanoi

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"⁵⁵. The evidence available suggests that climate change impacts can already be felt. The USAID⁵⁶ cites several trends observable since 1960, including a +0.5oC 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.

These trends and predictions are echoed in numerous other authoritative reports. For example, a joint MoNRE/UNDP report⁵⁷, 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.

⁽⁵⁵⁾ World Bank (2011) **Vietnam Climate Risk and Adaptation Country Profile** World Bank, Washington D.C. page 1

⁽⁵⁶⁾ USAID (2017) **Climate Change Risk Profile Fact Sheet: Vietnam** USAID, Washington D.C.

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 2050⁵⁸. 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 exports⁵⁹. These effects will be particularly acute in deltas and coastal areas but will be felt throughout the country.

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 society⁶⁰. 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



⁽⁵⁷⁾ UNDP et al (2015) **Vietnam Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation** UNDP, Hanoi

⁽⁵⁸⁾ Chinowsky, P. et al (2015) **Road Infrastructure and Climate Change in Vietnam** Sustainability 2015, 7, 5452-5470

⁽⁵⁹⁾ World Bank (2011) **Vietnam Climate Risk and Adaptation Country Profile** World Bank, Washington D.C. page 1

Dung in Decision 2139/QĐ-TTg on December 05, 2011. The strategy states that: “According to climate change scenarios, in late 21st century, Viet Nam’s yearly mean temperature will go up by 2-30C, 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.

3. 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 report⁶¹ 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” (page 1).

GIZ⁶² give a similar definition for resilience in Metropolitan Regions: “The ability of a metropolitan region and its component systems to anticipate, absorb, accommodate, 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 ACCRN⁶³: “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”.

BOX 3

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



Site visit on flood management of SECO-GIZ in Rach Gia City, Kien Giang Province 2017

⁶⁰ Le 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

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

⁶² Rosenzweig, C., Bader, D. & Ali, S. (2014) **Enhancing Climate Resilience in Metropolitan Regions** GTIZ Discussion Paper, GIZ Bonn

⁶³ ACCRN (2012) ACCRN Cities Project 34, quoted in Rosenzweig et al (2014) *ibid*.

Meerow et al (2016)⁶⁴ 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.”* (page 39).

Three key features of resilience⁶⁵ 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.

BOX 5

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 GTIZ Discussion Paper, GIZ Bonn



⁽⁶⁴⁾ Meerow, S. et al (2016) **Defining Urban Resilience: a Review** *Landscape & Urban Planning* vol 147, pages 38 – 49

⁽⁶⁵⁾ Walker, B., Holling, C. S., Carpenter, S. R. & Kinzig, A. **Resilience, adaptability and transformability in social-ecological systems.** *Ecology and society* 9, 5 (2004).



Da Nang City

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 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 Habitat⁶⁶ 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 report⁶⁷ 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*” (page 7).

⁶⁶ UN Habitat (2016) **Addressing Climate Change in National Urban Policy** Cities and Climate Change Initiative, Policy Note no. 4, UN Habitat, Nairobi

⁶⁷ UN-Habitat, 2015, National Urban Policy: A guiding framework. Nairobi

BOX 6

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, Washington D.C. page 24

BOX 7

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 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.

At the local government level, the World Bank⁶⁸ 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 particularly 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.

⁽⁶⁸⁾ Prasad, N. et al (2009) **Climate Resilient Cities** World Bank, Washington D.C.



Da Nang City

In an additional report⁶⁹, 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.

The development of improved resilience in Metropolitan Regions can bring direct economic benefits as well as long-term risk reduction. For example, in Semarang Indonesia⁷⁰ 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 programme⁷¹ 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.

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

⁽⁶⁹⁾ Jha, A. & Brecht, H. (2013) **Building Urban Resilience in Asia** World Bank, Washington D.C.

⁽⁷⁰⁾ Asian Cities Climate Change Resilience Network (2016) **Achievements in Building Capacities, Changing Practices and Strengthening Networks** ISET, Boulder, Colorado, USA

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