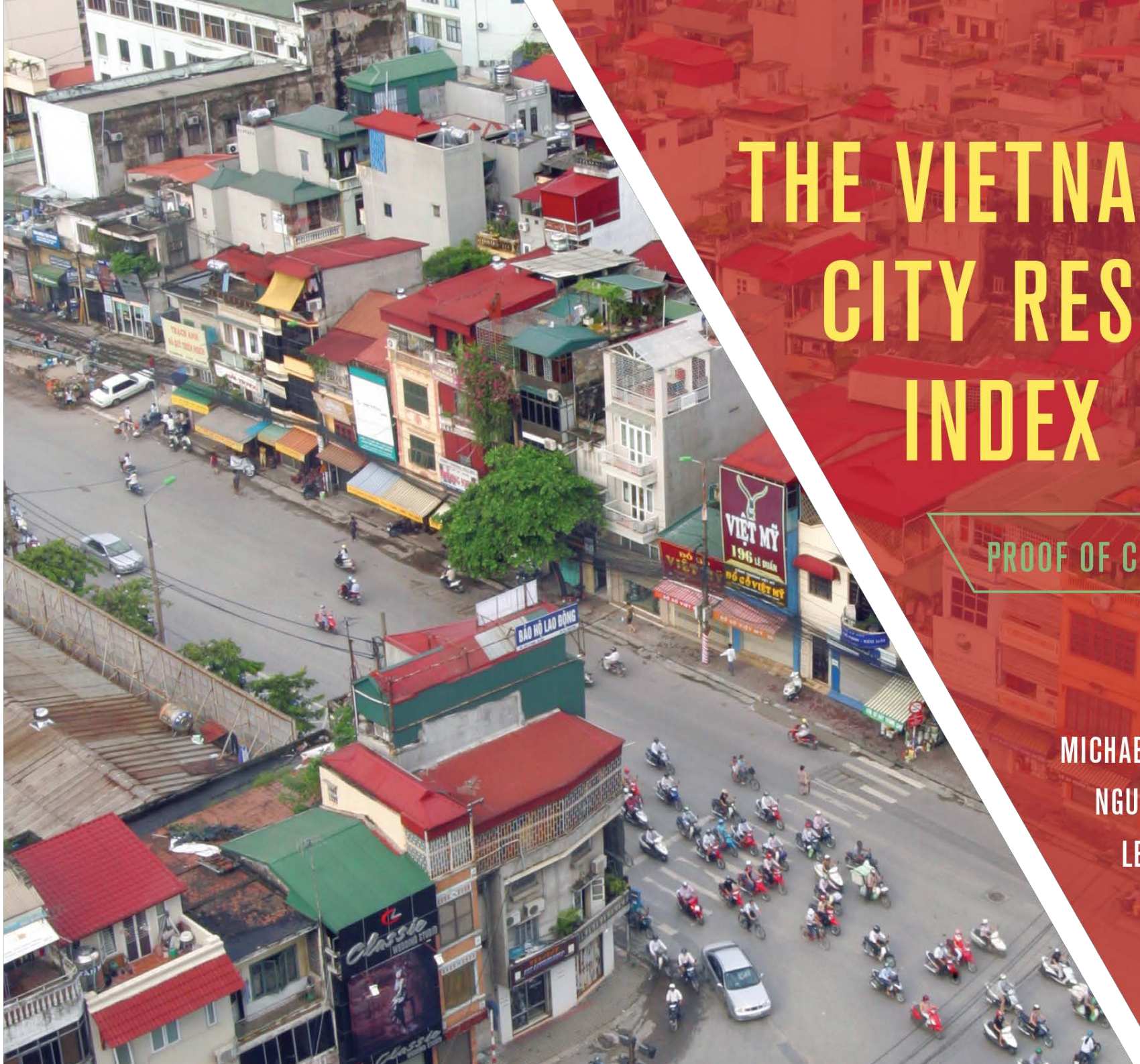

THE VIETNAM CITY RESILIENCE INDEX

PROOF OF CONCEPT REPORT

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Proof of Concept Report

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THE ASIA FOUNDATION

List of abbreviations

ACCCRN	Asian Cities Climate Change Resilience Network
CPC	City People's Committee
CRF	City Resilience Framework
CRI	City Resilience Index
D2623	Decision 2623 of the Prime Minister
DARD	Department of Agriculture and Rural Development
DoNRE	Department of Natural Resources and Environment
DoLISA	Department of Labor, Invalids and Social Affairs
DPI	Department of Planning and Investment
GSO	General Statistics Office
ISET	Institute for Social and Environmental Transition
MoC	Ministry of Construction
PPC	Provincial People's Committee
100RC	100 Resilient Cities
TAF	The Asia Foundation
UDA	Urban Development Agency
VNCRI	Vietnam City Resilience Index
VUPDA	Vietnam Urban Planning and Development Agency

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Michael DiGregorio

May 17, 2018

Forward

For over a decade, The Rockefeller Foundation has been at the forefront of efforts to build the resilience of cities as they seek to cope with the combined effects of migration, development and climate change. When the Foundation launched its Asian Cities Climate Change Resilience (ACCCRN) initiative in 2008, knowledge in this domain was limited, especially among small and mid-sized cities with scarce resources. Cities had very limited data on climate change impacts, few tools for identifying appropriate solutions, and limited resources to invest in concrete actions. Moreover, the human effects of climate change were not immediately or easily comprehensible to city stakeholders, and a common refrain was that addressing climate change was a 'luxury they could not afford'.

ACCCRN pioneered a unique set of tools and capacities that helped illustrate how climate change and rapid urbanization were already undermining gains in areas such as public health, water management, livelihoods and disaster preparedness. Through an intensive multi-stakeholder process of research, strategy formulation, solution-prioritization, and capacity building over several years, ACCCRN cities (including three pioneers in Vietnam; Da Nang, Can Tho and Quy Nhon) grew to appreciate that there is indeed a 'resilience dividend' for people, communities and the city as a whole, and have taken impressive actions as a result. The lessons from ACCCRN helped inform the development of more generalizable tools such as the City Resilience Framework and Index, and the expansion of resilience building through the 100 Resilient Cities initiative, which is now a global movement active across five continents.

This ground-breaking report by The Asia Foundation is the first effort globally to undertake *comparative assessment of city resilience* across a large cohort of cities within a single country. It provides a comprehensive view of strengths and weaknesses across 12 core areas and a number of sub-indicators, and can be used by government agencies, international development partners and others to foster greater awareness and action on resilience building in Vietnam. We also believe that lessons from developing the Vietnam index will be valuable as a guide to other governments and agencies committed to enhancing urban resilience.

Deepali Khanna
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Associate Vice-President, Power
(former team lead for ACCCRN)

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Executive Summary

The Vietnam City Resilience Index began as an attempt to test whether the City Resilience Framework (CRF) developed by Arup International Development could be used to create a comparative national city resilience index. Through its combination of analytical approaches, the VNCRI has proven itself to be a useful tool for monitoring city resilience which, because it is a comparative index, also provides incentive to improvement through competition between cities for higher rankings.

The project was funded by the Rockefeller Foundation, which has a decade-long interest in developing methods to monitor and improve city resilience, but was made possible by Decision 2623 of the Prime Minister on Urban Climate Adaptation. Under Decision 2623, the Urban Development Agency under Vietnam's Ministry of Construction, was tasked with developing a database on urban climate adaptation. By nature of the implementing agency, this database would need to focus on issues related to construction and planning in the public domain. Thus, not only would the project need to adapt the CRF for use as a national, comparative index, it would also need to do so with a focus on the data collection needs of the Urban Development Agency.

In the initial design phase, the core group composed of staff from The Asia Foundation (TAF), the Institute for Social and Environmental Transition (ISET) and the Urban Development Agency (UDA) focused on three levels of assessment using the CRF's four dimensions, 12 goals, and 52 indicators as guide. Quantitative variables would serve as proxies for relevant indicators. Qualitative scenarios would use a 1-10 scale to rate each city's performance in meeting the objectives of these same indicators. Given the particular needs of the UDA, some of the Arup indicators would be assessed using spatial criteria. Finally, a vulnerability assessment that used a mapping exercise to rate the frequency and impact of natural disasters would be used to assess risk levels.

Each of these elements of the index was developed, refined and tested during the pilot phase of the project. Five cities in different regions of the country were included in the pilot phase. Arup's City Resilience Index (CRI) was published as project teams were developing the VNCRI through the pilot phase of the project. While their goals and approaches differ substantially, the CRI's 156 quantitative and 156 qualitative metrics became an important reference source for development of the VNCRI's metrics.

An additional 28 cities and towns were included in the VNCRI's rollout. The results of this process of data collection and analysis are the subject of this report. While response rates varied, enough data was provided by 20 cities and towns to provide useful analysis. One of the insights of this project is that differences in scores for the 12 quantitative and qualitative goals can serve as a catalyst for understanding the contexts of resilience capacity at the city level. At the first level, this involves examining the indicators and variables that make up the score for each goal. This combination of factors provides the first hint in understanding the strengths and weaknesses of each city. Second, contextual evidence can often be found in online news sources that describe recent natural disasters, infrastructure investments, economic and demographic transitions, and other factors that might influence the quantitative or qualitative score for each goal. Finally, GOOGLE Earth offers a means of examining physical changes in the city over time. This may include physical growth, densification, construction of gated communities, beach resorts, new roads, nearby hydroelectric dams, and many other physical features that affect the city's resilience capacity. All three of these approaches combine to add nuance to the observed

differences between qualitative and quantitative goal scores and their overall averages.

Using these methods, this proof of concept report offers first, a general assessment based on the average quantitative and qualitative scores for each of the 12 CRF goals. It then examines two particular cases, Son La, which had relatively low scores, and Thai Binh, which had relatively high scores. Finally, it ranks each city based on the 12 CRF goals and examines both high- and low-ranking cities. City snapshots, which compare each city's goal scores to the overall averages, are included in an appendix. We have chosen not to provide an overall ranking of cities in deference to the wide variations in city contexts. These variations can give some cities natural advantages over others in terms of physical geography, climate or economic opportunities. Thus said, the particular rankings by goals offer a substantial means of comparing the factors that make some cities more resilient than others, while the indicators that make up these scores offer a useful means of monitoring resilience capacity.

Introduction

In July 2015, the Rockefeller Foundation granted The Asia Foundation (TAF) funding to test whether and how the City Resilience Framework (CRF) developed by Arup International Development (Arup) could be used to gauge city resilience at a national, comparative level. The project was conceived as a break from the intensive, city level resilience assessments, planning and projects framework developed within the Asian Cities Climate Change Resilience Network (ACCCRN), also funded by the Rockefeller Foundation. Rather, the Vietnam City Resilience Index (VNCRI) should provide an evidence-based tool for rapid, ongoing assessment of city resilience at a national level. With 100 Resilient Cities (100RC) already adopting Arup's CRF, bringing a growing number of cities into the network, working at a national scale with a modified tool appeared as a reasonable next step in use of the CRF.

The opportunity to test the Arup framework in this way was made possible by Decision 2623 on Urban Development Responding to Climate Change issued by Vietnam's Prime Minister, Nguyen Tan Dung, in 2013. Decision 2623 (D2623) is organized as a set of program tasks that incudes research and training, building a database and mapping system for urban climate risk, integration of climate change into urban planning, management and development regulations, and development of pilot climate action plans and projects affecting a range of city contexts. The project partners believed that, by focusing on implementation of D2623, they would be able to define a core set of variables that could serve as a diagnostic tool, resilience tracking database, and criteria for use in managing urban development.

Arup's CRF[1] is built on four fundamental dimensions of urban resilience: Health and Wellbeing, Economy and Society, Infrastructure and Environment, and Leadership and Strategy. Each dimension contains three goals which reflect the actions cities can take to improve their resilience. These 12 goals form the core of the CRF. When taken together they represent a city's resilience to a wide range of shocks and stresses.

These 12 goals are articulated through 52 indicators, three to five for each of the goals. These indicators are complimented by seven emergent properties, referred to as *qualities*, that emphasize the dynamic relationships between institutions, information, and infrastructure in resilient cities. As such, one or more of these seven qualities – reflexivity, robustness, redundancy, flexibility, resourcefulness, inclusiveness, and integration - can be observed in each of the city's systems, from power grids to public administration. A description

Descriptions of Arup's city resilience dimensions and goals are included below, and a full list of indicators is included in the following table.

[1]Arup International Development, 2015. *City Resilience Framework* accessed at 28 February 2018 https://www.rockefellerfoundation.org/report/city-resilience-framework/ .

Health and wellbeing

Everyone living and working in the city has access to what they need to survive and thrive.

- **Meets Basic Needs.** Provision of essential resources required to meet a person's basic physiological needs.
- **Supports Livelihoods and Employment.** Livelihood opportunities and support that enable people to secure their basic needs. Opportunities might include jobs, skills training, or responsible grants and loans.
- **Ensures Public Health Services.** Integrated health facilities and services, and responsive emergency services. Includes physical and mental health, health monitoring and awareness of healthy living and sanitation.

Leadership and strategy

The processes that promote effective leadership, inclusive decision-making, empowered stakeholders, and integrated planning.

- **Promotes Leadership and Effective Management.** Relating to government, business and civil society. This is recognizable in trusted individuals, multi-stakeholder consultation, and evidence-based decision-making.
- **Empowers a Broad Range of Stakeholders.** Education for all, access to up-to-date information, and knowledge to enable people and organizations to take appropriate action. Along with education and awareness communication is needed to ensure that knowledge is transferred between stakeholders and between cities.
- **Fosters Long-Term and Integrated Planning.** Holistic vision informed by data. Strategies/plans should be integrated across sectors and land-use plans should consider and include different departments, users and uses. Building codes should create safety and remove negative impacts.

Economy and society

The social and financial systems that enable urban populations to live peacefully, and act collectively.

- **Promotes Cohesive and Engaged Communities.** Community engagement, social networks and integration. These reinforce collective ability to improve the community and require processes that encourage civic engagement in planning and decision-making.
- **Ensures Social Stability, Security and Justice.** Law enforcement, crime prevention, justice, and emergency management.
- **Fosters Economic Prosperity.** While Driver 2 is about individual livelihoods, Driver 6 is about the economy on a wider scale. Important economic factors include contingency planning, sound management of city finances, the ability to attract business investment, a diverse economic profile and wider linkages.

Infrastructure and environment

The man-made and natural systems that provide critical services, protect, and connect urban assets enabling the flow of goods, services, and knowledge.

1. **Enhances and Provides Protective Natural and Man-Made Assets.** Environmental stewardship, appropriate infrastructure, effective land use planning and enforcing regulations. Conservation of environmental assets preserves the natural protection afforded to cities by ecosystems.
2. **Ensures Continuity of Critical Services.** Diversity of provision, redundancy, active management and maintenance of ecosystems and infrastructure, and contingency planning
3. **Provides Reliable Communication and Mobility.** Diverse and affordable multi-modal transport networks and systems, ICT and contingency planning. Transport includes the network (roads, rail, signs, signals etc.),

Table 1. CRF Dimensions, Goals and Indicators

Health and Well-being

1. Minimal human vulnerability

1.1 Safe and affordable housing
1.2 Inclusive access to safe drinking water
1.3 Adequate affordable energy supply
1.4 Effective sanitation
1.5 Sufficient affordable food supply

2. Diverse livelihoods and employment

2.1 Inclusive labor policies
2.2 Relevant skills and training
2.3 Dynamic local business development and innovation
2.4 Supportive financing mechanism

2.5 Diverse protection of livelihood following a shock

3. Adequate safeguards to human life and health

3.1 Robust public health systems
3.2 Adequate access to quality healthcare
3.3 Emergency medical care

3.4 Effective emergency response services

Economy and Society

4. Collective identity and mutual support

4.1 Local community support
4.2 Cohesive communities

4.3 Strong citywide identity and culture
4.4 Actively engaged citizens

5. Social stability and security

5.1 Effective systems to deter crime

5.2 Proactive corruption prevention
5.3 Competent policing
5.4 Accessible criminal and civil justice

6. Economic security and financial management

6.1 Well-managed public finance

6.2 Comprehensive business continuity planning
6.3 Diverse economic base
6.4 Attractive business environment

6.5 Strong integration with regional and global economies

Infrastructure and Environment

7. Reduced physical exposure

7.1 Comprehensive hazard and exposure mapping
7.2 Appropriate codes, standards and enforcement
7.3 Effective managed protective ecosystems
7.4 Robust protective infrastructure

8. Continuity of critical services

8.1 Effective stewardship of ecosystems
8.2 Flexible infrastructure services

8.3 Retained spare capacity

8.4 Diligent maintenance and continuity
8.5 Adequate continuity for critical assets and services

9. Reliable communications and transport

9.1 Diverse and affordable transport networks
9.2 Effective transport operation and maintenance
9.3 Reliable communication technologies
9.4 Secure technology networks

Leadership and Strategy

10. Effective leadership and management

10.2 Effective co-ordination with other government bodies
10.3 Proactive multi stakeholder collaboration
10.4 Comprehensive hazard monitoring and risk assessment
10.5 Comprehensive government emergency management

11. Empowered stakeholders

11.1 Adequate education for all

11.2 Widespread community awareness and preparedness
11.3 Effective mechanisms for communities to engage with government

12.Intergrated development planning

12.1 Comprehensive city monitoring and data management
12.2 Consultative planning process

12.3 Appropriate land use and zoning

12.4 Robust planning approval process

With the introduction of Arup's City Resilience Index (CRI) in 2015,[2] each indicator in the framework was assigned a set of quantitative variables and corresponding qualitative scenarios. All totaled, the CRI includes 312 metrics, 156 each for the quantitative and qualitative assessments. While the VNCRI and CRI differ in purpose, they share a common framework that made it possible to refer to Arup's metrics in determining appropriate and accessible metrics for the VNCRI.

Methodology

Metric development

The VNCRI uses a set of variables and scenarios based on the CRF to produce a national comparative city resilience index. Development and implementation of the VNCRI was divided into three key components. First, a core group consisting of two members each of The Asia Foundation (TAF), The Institute for Social and Environmental Transition (ISET), and the Ministry of Construction's Urban Development Agency (UDA), developed a methodology, timeline for implementation, and initial set of variables. In phase two, the pilot phase, staff of city and province agencies, departments and offices were introduced to the CRF, conducted participatory risk assessments, and assessed the CRI's quantitative variables based on suitability and access, modifying and replacing them where necessary. Each of these cities-Lao Cai, a border trading town in the northwest; Cam Pha, a coal mining town in the northeast; Hoi An, a UNESCO heritage site on the central Vietnamese coast, Gia Nghia, a coffee growing and trading town in the central highlands, and Ca Mau, a seafood processing and export city in the Mekong Delta – also implemented the data collection toolkit they had helped to develop. Data was collected for 49 qualitative scenarios and 47 quantitative variables. Complete responses were provided for all 49 scenarios and 44 out of 47 quantitative variables. Participants used these results, presented in city resilience profiles, to prepare resilience action plans that were presented to vice chairmen of city level People's Committees and the directors or vice directors of provincial Departments of Construction.

The pilot phase introduced a full set of Arup's quantitative indicators and variables, narrowed this down to a list of what was likely to be available, and through discussions with participants, modified accordingly. While satisfied with the outcomes of the pilot phase, the core group was concerned that the toolkit was not ready for the final phase of the project, rollout to 28 cities nationwide. TAF contracted two well-known Vietnamese urbanists with experience in index development to review the toolkit that emerged out of the pilot phase, compare it with Arup's format, procedures, and metrics, and make recommendations to the core group. Their worked resulted in a revision of the qualitative best case/worst case scenarios and an increase in the number of quantitative variables that included all 52 indicators. The core group reviewed their recommendations, revising the language of variables and scenarios as required, and by early 2017 established one scenario for each indicator and 111 quantitative variables spread over the 52 indicators.

Rollout and verification

Rollout began with a series of one-day regional training workshops held in Ha Noi, Da Nang, and Can Tho. Participants included staff of the City's

[2] Arup International Development, 2016. *Inside the CRI: Reference Guide*, accessed on 28 February 2018 at http://www.cityresilienceindex.org/wp-content/uploads/2016/05/160516-Inside-the-CRI-Reference-Guide.pdf.

People's Committee (CPC), provincial Department of Construction (DoC), and the provincial Steering Committee for Response to Climate Change (SCRCC).

Toolkit materials were sent to these local assessors weeks before the workshops. This allowed time to begin collecting data and preparing their own questions to facilitators and trainers. During these workshops, participants noted the lack of availability or sensitivity of some of the quantitative variables. By the end of the third workshop, 23 variables were cut leaving 89 for data collection. All 52 qualitative scenarios remained unchanged. Data collection was completed in July 2017 with 20 of the 28 cities providing usable quantitative data, and 19 responding to all the scenarios.

The data returned to the core group was cleaned through a process that looked for inconsistencies. Some of these could be explained through lack of use of the proper denominators. For example, a common error was use of total urban population rather than "per 10,000 residents" in calculation of population related variables. In such cases, the errors were corrected. In other cases, the data provided was so inconsistent that we labeled the variable "suspicious." Of the 89 variables used during rollout, 10 were regarded as suspicious.

In preparation for verification, TAF staff searched for alternative sources of data for cut, missing or suspicious data. In all, 11 variables were filled or replaced using alternative data sources. The most important source, the Provincial Competitiveness Index, is recognized as biased toward urban areas where a majority of the Vietnam Chamber of Commerce members polled in this survey live and work. In addition, 13 variables that were either cut during rollout or whose data was regarded as suspicious were reworded to make them clearer or more easily quantified. These were included in the verification data request sheets and are also included in the final set of variables included in the survey.

Verification was completed in March 2017. Seven of the 20 cities included in the index returned verified and updated data sheets. These data sheets, plus those previously provided by other cities, were used in the final analysis.

Table 2. VNCRI Cities and Towns

NO.	PROVINCE	CITY OR TOWN
1	Dien Bien	Muong Lay
2	Bac Kan	Bac Kan
3	Ha Giang	Ha Giang
4	Son La	Son La
5	Hoa Binh	Hoa Binh
6	Thai Binh	Thai Binh
7	Nam Dinh	Nam Dinh
8	Quang Ninh	Uong Bi
9	Thanh Hoa	Sam Son
10	Ha Tinh	Ha Tinh
11	Thua Thien Hue	Hue
12	Dak Lak	Buon Ma Thuot
13	Can Tho	Can Tho
14	Ba Ria Vung Tau	Vung Tau
15	Hau Giang	Vi Thanh
16	Soc Trang	Soc Trang
17	An Giang	Long Xuyen
18	Tien Giang	Go Cong
19	Bac Lieu	Bac Lieu
20	Kien Giang	Rach Gia

Hình 1. Vị trí của các thành phố và thị xã tham gia VNCRI

Data assessment

Qualitative

Nine cities and towns, roughly a third (32.1%) *did not* submit any qualitative forms. Given the positive feedback on the scenarios received during the rollout trainings, this was surprising. Our calculations, based on the pilot phase of this project, suggested that one person could rate all the scenarios in 1.5-2.0 hours. Spread over one week, we did not consider this to be a burden on local officials. Furthermore, most provinces did not follow instructions about the agencies that should be responsible for completing the scenarios. Specifically, most provinces did not provide three sets of survey data from the DoC, CPC, and provincial SCRCC as instructed. Agencies surveyed by the cities and provinces included the Department of Agriculture and Rural Development (DARD), Department of Natural Resources and Environment (DoNRE), Department of Planning and Investment (DPI), and, in some cases, research institutes. In some provinces, one department sent multiple forms, filled by the head and deputy head of a division or director and deputy director of a department. Almost half (46.4%) of the 19 cities and towns that submitted their filled questionnaires did not submit all three forms as requested. At the same time, three cities sent more than three forms. One even sent seven forms.

Fortunately, most submitted forms had all questions completed. However, in a couple of cities and towns, the answers provided by two different departments were identical, or the answers in one form were identical for all questions, suggesting that the focal point filled in the forms rather than ask those outside his or her agency to do so.

Quantitative

Six (21.4%) of the 28 cities and towns *did not* submit any quantitative data. Among the 22 cities that did submit quantitative data, most did *not* follow the implementation guidelines. During the pilot phase, participants carefully identified data sources assuming that, if these sources were available in the pilot cities, they would also be available in other cities. These sources were noted in the rollout trainings. Unfortunately, some of the focal points at the city level appear to have had very limited access to data outside their departments or were unwilling to request data from outside. Further, while some variables required calculations, some assessors sent only raw data. One city returned 15 different photocopied data sheets.

No cities and towns provided 100% of the data requested. Six of them (21.4% of the 28 cities and towns) provided less than 50% of requested data; and only four (14.3%) provided more than 80% of the requested data. There were also considerable variances in data provided by the cities and towns. In some cases, this was due to errors or lack of calculation resulting in different denominators among cities. This was the particular case for variables whose denominator was *per 10,000 residents*. In other cases, they simply were not careful. For example, for monthly per capita income, some put in the value of 12 or 6.6 (assuming the unit to be *million* VND); for indicators that required the answer to be a specific year, some put in a range of years; and for some indicators that ask for a percentage, some put in 'about X%'. Because of this, cleaning the raw data became a huge burden on ISET and TAF and eventually led to a request for cities to verify their data.

Among the 32 variables that were cut during rollout or contained highly variable or suspicious data, 18 were retained in the verification process. The verification data set thus included 97 variables. When the verified data sets were returned, 13 variables remained either blank or did not contain enough cases to make them useful for analysis. Of the remaining 84 variables, the average response rate was 69 percent with a range varying from 34% (Nam Dinh) to 84% (Son La). All 20 cities provided data for 25 quantitative variables (30%); 19 cities provided data for 31 variables (37%); 18 cities

provided data for 38 variables (45%), and 17 cities provided data for 42 variables (50%).

Normalization and aggregation

Both the qualitative and quantitative data were normalized using a 1-5 scale. The scale is relative, not absolute. A high score thus signifies "more resilient" and a low score signifies "less resilient" within the sample of cities. Using this range made it possible to remove missing data and zeros in the clean, normalized data set. Given the types of data being collected, zero could not be a legitimate answer, but rather, represented "no data", "unknown", or data cells automatically filled in the normalization process. The scores for each city were then aggregated for each of the CRF's 12 goals and four dimensions.

Given variability in response rates, these aggregated scores may be based on incomplete data sets. For this reason, the results of this project are divided into four parts. First, we provide a general overview based on the average scores for each of the 12 quantitative and qualitative goals. Second, these averages are then used as a means of assessing the performance of two cities, one with high scores and the other with low, both of which have also submitted at least 80 percent of the quantitative data. Third, city rankings list the scores for individual cities in order under each of the VNCRI's 12 goals. Finally, city snapshots compare the results of individual cities against the overall averages per goal. For each goal, the number of data points included in the score is also presented against the total number possible. For example, 5/7 would mean that out of seven possible variables, data was provided for five.

Incomplete data sets, implementation guidelines that were not followed completely, the incapacity of a central government agency to acquire data from its related provincial departments, and lack of incentives for local government to complete data entry forms each contributed to less than optimal outcomes in the data collection process. However, the results, even with these limitations, provide useful information on city resilience capacity in Vietnam and demonstrates a "proof of concept" for the use of a resilience index to a comparative monitoring tool for city resilience.

Results

A view from the averages

The combined average scores for all 20 cities in the index grouped by the 12 VNCRI goals generally fall within the mid-range, though differences between the qualitative and quantitative scores vary significantly. The lowest scores fell under *collective identity and community support* (4) and e*ffective leadership and strategy* (10). The extremes in the quantitative data and their relationship to corresponding qualitative scores suggest that both the capacity of leadership and community identity may be overrated in the qualitative scores, while housing, basic infrastrucuture and reduced exposure to hazards may reflect institutional biases within the quantitative data.

Table 3. Average Quantitative and Qualitative Scores for 20 Cities and Towns

Goals	*Quantitative*		*Qualitative*	
	Cities with data	Avg.	Cities with data	Avg.
1. Minimal human vulnerability	20/20	3.6	19/20	3.1
2. Diverse livelihood and employment	20/20	2.6	19/20	2.7
3. Effective safeguard to human health & life	20/20	3.0	19/20	2.8
4. Collective identity and community support	18/20	2.2	19/20	3.3
5. Security and rule of law	20/20	3.2	19/20	3.3
6. Sustainable economy	20/20	2.5	19/20	2.9
7. Reduced exposure and fragility	20/20	3.6	19/20	3.0
8. Effective provision of critical services	20/20	3.1	19/20	3.1
9. Reliable mobility and communications	20/20	2.7	19/20	3.3
10. Effective leadership and management	20/20	1.9	19/20	3.2
11.Empowered stakeholders	16/20	3.5	19/20	3.1
12. Integrated development planning	20/20	3.6	19/20	3.5

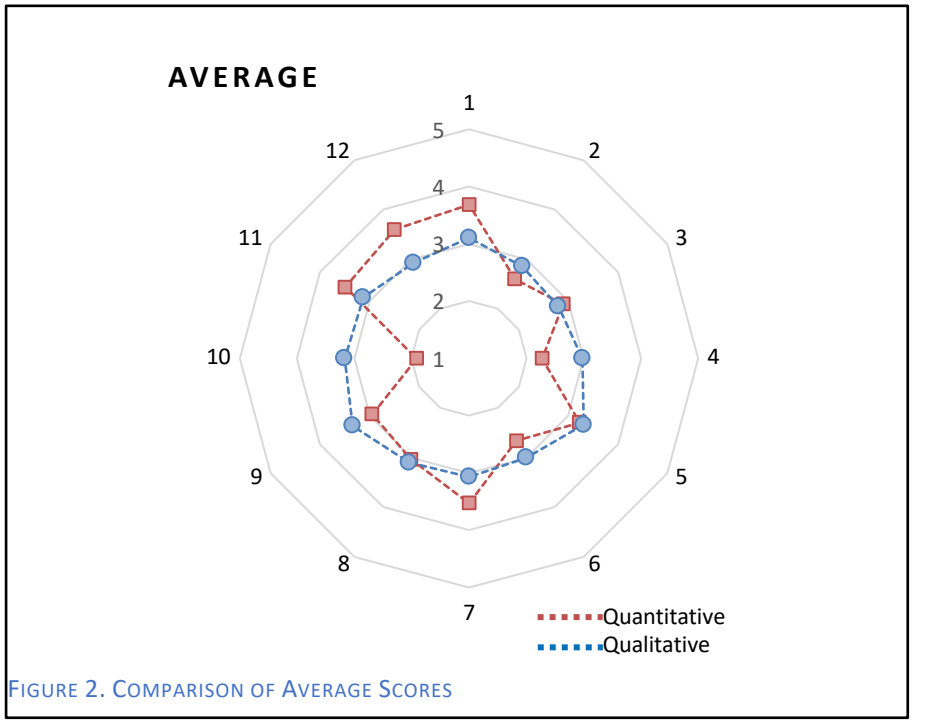


Figure 2. Comparison of Average Scores

City focus

While the averages are likely to represent issues relevant to Vietnamese cities as a whole, research suggests that each city's resilience capacity emerges within its own unique context. In principle, data collected in this study should point to the challenges that each city faces. Four cities and towns, Son La, Thai Binh, Uong Bi and Buon Ma Thuat provided responses for at least 80 percent of the quantitative variables. Among these four, only Uong Bi did not provide responses to all of the qualitative scenarios. Among the remaining three, the two cities with the highest and lowest scores can be used to understand responses to the challenges cities face. Son La, which

provided data for 84 percent of the quantitative variables, had a combined quantitative and qualitative score of 2.3. Thai Binh, which provided data for 82 percent of the quantitative variables, had a combined score of 3.4.

Son La

Son La Town has the lowest overall resilience score in the qualitative assessment and is tied with Bac Lieu for the second lowest overall score in the quantitative assessment. Therefore, it comes as no surprise that many of the city's scores fall below the averages. Understanding where and how they diverge might therefore provide some insight into the dynamics of this city's relatively low resilience capacity.

Son La's quantitative scores for collective identity (4), reliable mobility and communications (9), and effective leadership and management (10) are higher than the average for other cities. However, all of its qualitative scores and a majority of its remaining quantitative scores are below the average. More specifically, the qualitative scores for diverse livelihoods (2) and sustainable economy (6) are very low compared to the average of the other cities and its quantitative score for diverse livelihoods (2) is well below the average.

TABLE 4. COMPARISON OF QUANTITATIVE AND QUALITATIVE SCORES, SON LA

	Quantitative			*Qualitative*		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.2	5/5	3.1	2.8
2. Diverse livelihood and employment	10/10	2.6	1.8	6/6	2.7	1.1
3. Effective safeguard to human health & life	5/7	3.0	2.3	4/4	2.8	1.6
4. Collective identity and community support	5/5	2.2	3.5	4/4	3.3	1.8
5. Security and rule of law	8/8	3.2	3.3	3/3	3.3	2.4
6. Sustainable economy	6/7	2.5	2.3	5/5	2.9	1.1
7. Reduced exposure and fragility	6/6	3.6	3.6	4/4	3.0	1.6
8. Effective provision of critical services	8/8	3.0	2.4	5/5	3.1	1.7
9. Reliable mobility and communications	7/8	2.7	2.8	4/4	3.3	1.5
10. Effective leadership and management	7/7	1.9	3.2	5/5	3.2	2.1
11.Empowered stakeholders	4/4	3.5	2.7	3/3	3.1	2.0
12. Integrated development planning	7/7	3.6	2.7	4/4	3.5	2.0

Son La is the only city in which each qualitative score is lower than its corresponding quantitative one. Thus, the city's resilience capacity is much better when viewed from its quantitative scores than from its qualitative ones. For example, the city's qualitative scores are more than one point less than corresponding quantitative scores in the case of Goal 4 (collective identity and community support, -1.73), Goal 7 (reduced exposure, -1.98), Goal 9 (reliable mobility and communication, -1.24), and Goal 10 (effective leadership and strategy, -1.06). For comparison, while the average quantitative scores for all cities and towns for Goals 4, 9, and 10 are *greater* than the qualitative ones, in Son La's case, the qualitative scores are much *less*. Thus, the perception of community identity, reduced exposure and fragility, reliable mobility and communications, and leadership is both *lower* than the averages and *less* than Son La's quantitative scores would suggest.

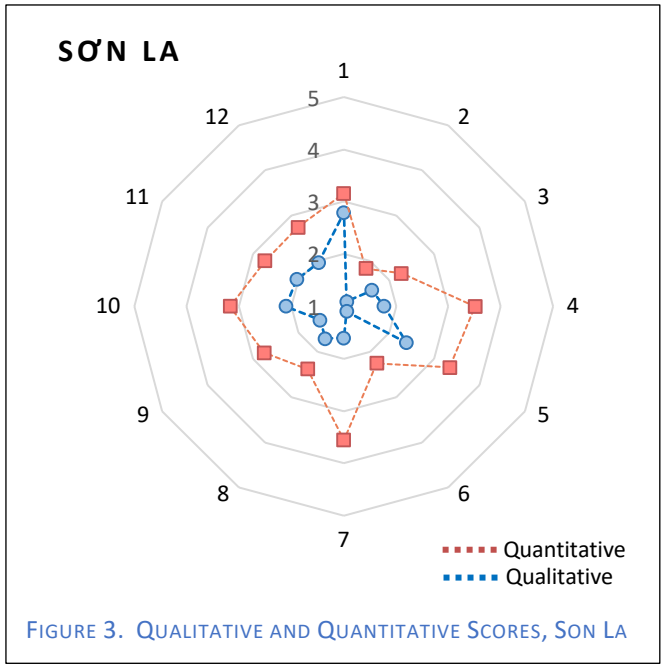


FIGURE 3. QUALITATIVE AND QUANTITATIVE SCORES, SON LA

This divergence requires explanation. Son La's quantitative scores for collective identity (Goal 4) and effective leadership (Goal 10) are both 1.3 points higher than the averages for all cities. Regarding Goal 4, Son La's score for quantitative variable 4.2.3, which assesses ethnic minority participation in local government, is 4.63. This score is second only to Hoa Binh (5.0) and multiple times greater than the average (1.72). And with respect to Goal 10, quantitative variable 10.3.1, which assesses consultation in policies related to natural disasters, Son La's score is 5.0, the highest score possible. Both scores would suggest high levels of social cohesion and bureaucratic coordination. According to the 2009 Population and Housing Census, roughly 60% of the population of Son La town is made up of ethnic minorities, the overwhelming majority being ethnic Thai. Nevertheless, its qualitative scores for Goals 4 and 7 fall well below the averages for all cities. This suggests a qualitative difference that may indicate underlying issues. The relatively low scores in the qualitative indicator 4.3, cultural identity (2.8), which one would expect to be high in a city like Son La, or the very low score for indicator 10.1, transparency and accountability (1.7) compared to the relatively high score for 4.1, mutual support (3.3), suggests that the city is stressed by cultural and governance transitions. Given also the relatively low regard for the contributions of private business, indicator 4.4 with a score of 2.3, the city may also be facing an economic transition that is undermining its resilience capacity.

Thai Binh

Thai Binh has the second highest overall score in the quantitative assessment and the fourth highest overall score in the qualitative assessment. Its scores for goals related to vulnerability (1), security (5), effective leadership (10), and empowered stakeholders (11) are well above the average for other cities. Its qualitative scores for provision of critical services (8), reliable mobility and communications (9), leadership (10), and empowered stakeholders (11) are also well above the average. At the same time, the city's other quantitative and qualitative scores are generally equal to the average.

TABLE 5. COMPARISON OF QUANTITATIVE AND QUALITATIVE SCORES, THAI BINH

	Quantitative			*Qualitative*		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	4.3	5/5	3.1	3.1
2. Diverse livelihood and employment	10/10	2.6	2.5	6/6	2.7	2.8
3. Effective safeguard to human health & life	7/7	3.0	2.9	4/4	2.8	2.6
4. Collective identity and community support	5/5	2.2	2.3	4/4	2.9	3.2
5. Security and rule of law	7/8	3.2	3.8	3/3	3.3	3.4
6. Sustainable economy	6/7	2.5	2.6	5/5	2.9	2.7
7. Reduced exposure and fragility	6/6	3.6	3.3	4/4	3.0	2.8
8. Effective provision of critical services	8/8	3.0	2.8	5/5	3.1	4.5
9. Reliable mobility and communications	7/8	2.7	2.7	4/4	3.3	4.8
10. Effective leadership and management	6/7	1.9	2.9	5/5	3.2	4.3
11.Empowered stakeholders	4/4	3.5	4.8	3/3	3.1	4.7
12. Integrated development planning	7/7	3.6	3.8	4/4	2.9	3.1

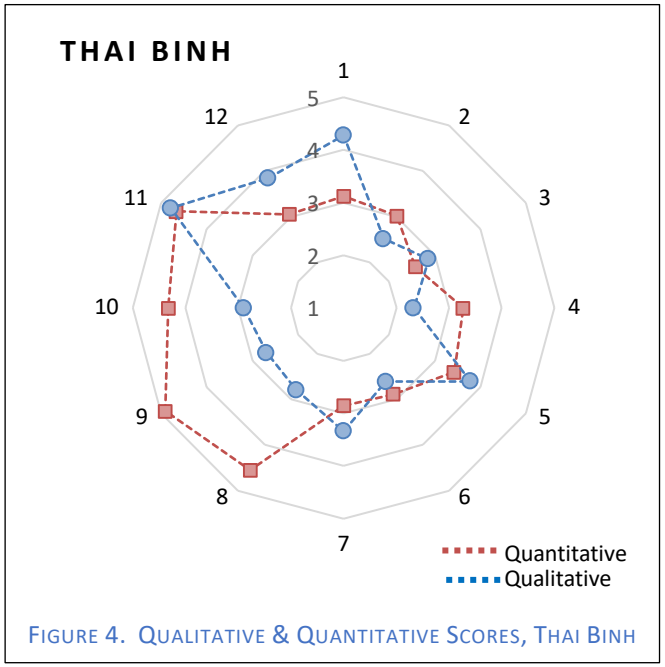


FIGURE 4. QUALITATIVE & QUANTITATIVE SCORES, THAI BINH

The town's quantitative and qualitative metrics match fairly well with regard to livelihoods (Goal 2-medium score), safeguards (Goal 3 – medium score), security (Goal 5 – high score), sustainable economy (Goal 6 – medium score), reduced exposure (Goal 7 – medium-high score) and empowered stakeholders (Goal 11 – high score). Its metrics diverge for vulnerability (Goal 1 – high quantitative), collective identity (Goal 4 – high qualitative), provision of critical services and reliable mobility and communication (Goals 8 and 9 – significantly high qualitative), and leadership (Goal 10-high qualitative). The data presented here suggests weaknesses in diversifying the economy, safeguarding human health, and building collective identity and community support. At the same time, the city may be doing better than others with respect to housing and empowering stakeholders. However, the large divergences between qualitative and quantitative metrics for the provision of critical services (Goal 8), reliable mobility and communications (Goal 9) and effective leadership (Goal 10) suggest a need

to look deeper into the data. These gaps could also serve as a means of pointing out where improvement is needed.

While most of Thai Binh's scores are high, its qualitative scores, particularly those in areas related to Dimension 3, infrastructure and environment, and Dimension 4, leadership and strategy are very high. This suggests an institutional bias. This is also apparent at the indicator level. Figure 5 shows the lopsided character of Thai Binh's scores for 52 qualitative indicators compared to its scores for the same quantitative indicators. Figure 6 shows how far its qualitative scores diverge from the averages. Table 6 lists the highest scoring qualitative indicators within Dimension 3 and 4 and compares them to their averages. Note that with the exception of indicator 11.1, inclusive education, all of these high scoring indicators are related to infrastructure and planning.

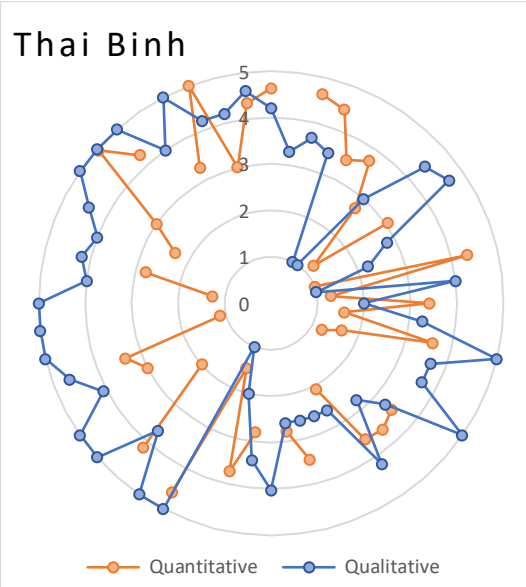


FIGURE 6. COMPARISON OF QUALITATIVE AND QUANTITATIVE INDICATOR SCORES, THAI BINH

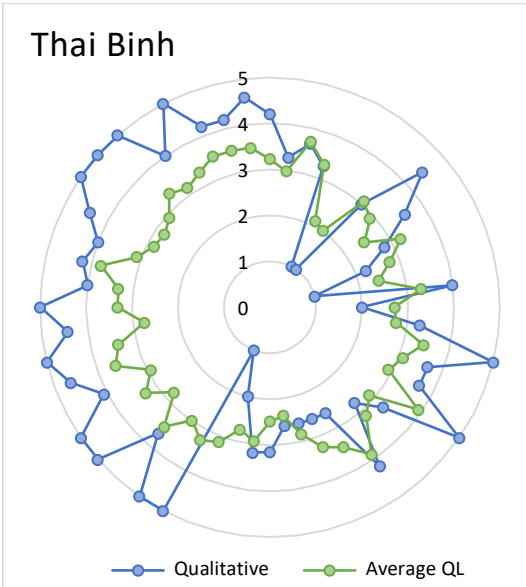


FIGURE 5. COMPARISON OF THAI BINH'S QUALITATIVE INDICATOR SCORES WITH THE AVERAGES

Assuming there is an upward bias in the qualitative data, examining the divergence between qualitative and quantitative scores for each of the 52 indicators would show where bias in the qualitative assessments might be greatest, and thus, where perception is not supported by statistical data.

For each of the indicators listed in Table 7, below, the gap between qualitative and quantitative scores is at least 1 one point. A low quantitative score (<2.0) plus a wide margin between it and the corresponding qualitative score (>2.0) would signify an indicator in which a relatively high perception was matched with a relatively low data point. Based on this logic, robust maintenance and operation of transport systems (9.2), robust and innovative business environment (2.3), adequate and inclusive access to healthcare (3.2), robust decision making by municipal government (10.1), distinctive cultural identity (4.3) and community social connectivity (4.2) represent priority areas in which Thai Binh can improve its resilience capacity.

Table 6. High Qualitative Indicator Scores for Goals 7-12, Thai Binh

No.	Indicator	Score	Avg.	Gap
7.4	Safeguards for critical infrastructure	5.0	3.3	1.7
8.1	Effectively managed ecosystems	5.0	3.0	2.0
8.3	Redundant capacity of systems	5.0	2.8	2.2
8.4	Sustaining infrastructure system and service continuity	5.0	3.3	1.7
9.3	Reliable communication technology	5.0	3.0	2.0
9.4	Safe technological networks	5.0	3.3	1.7
10.5	Comprehensive assessment of emergency situations	5.0	2.8	2.2
11.1	Inclusive education	5.0	2.9	2.1
11.2	Inclusive awareness and preparedness in the communities	5.0	3.3	1.7
12.1	Comprehensive city monitoring and data management	5.0	3.3	1.7

Table 7. Analysis of Gaps between some Qualitative and Quantitative Indicators, Thai Binh

No.	Indicator	QN Score	QL Score	Gap
2.3	Robust and innovative business environment	1.2	4.4	3.2
3.2	Adequate and inclusive access to healthcare	1.3	4.0	2.7
4.2	Community social connectivity	1.6	3.7	2.1
4.3	Distinctive cultural identity	1.2	3.7	2.5
9.2	Robust maintenance and operation of transport systems	1.1	5.0	3.9
10.1	Robust decision making by municipal government	1.3	4.0	2.7

Summary

Son La and Thai Binh were chosen for this city level assessment because both provided at least 80 percent of the quantitative data requested, and both are at opposite extremes of the overall rankings. When compared to the averages, the issues that affect these particular cities come into view. In Son La, where qualitative scores are consistently lower than quantitative scores, there appears to be underlying issues generating negative perceptions, despite higher quantitative scores. The gaps between this city's qualitative and quantitative scores, and comparisons with the overall averages suggest the city is undergoing a transition that affects its governance and its resilience capacity. In general, Thai Binh has relatively high scores compared to other cities in this index. However, its highest qualitative scores are largely in areas related to leadership, infrastructure and planning, suggesting an institutional bias in the survey that results in a more positive perception of the city's resilience capacity than the data supports. Nevertheless, by reading the data against the grain, gap analysis can be used to suggest areas in which the city needs improvement.

Rankings

General overview

We approach the city ranking in this section of the study with a number of caveats. As noted above, the quantitative data provided by the 20 cities in this study is not consistent. The average response rate was 69 percent, though some cities provided much less and others much more. Four cities provided at least 80 percent of the data requested while 25 out of 84 variables have 100 percent response rates. Furthermore, while most cities provided responses to all of the scenarios, as seen in the Thai Binh case above, the qualitative data may be biased in favor of the planning and infrastructure mission of provincial DoC's. For these reasons, rather than offering a ranking based on a numerical scale, we have chosen to offer three

levels, *high*, *medium* and *low* using the standard deviation of scores for each goal to set the cut off points for each level.

As a means of ranking cities, we have taken the average scores for the 14 cities and towns that have provided both quantitative and qualitative data. For the combined scores for each of the 12 goals, we have used the standard deviation to set break points between low and medium, and medium and high. For example, if the minimum value is 1.0, the standard deviation is 0.5 and there are 6.0 standard deviations in the sample, the break point between low and medium can be calculated as Minimum Value + (the Break Point being determined [1 or 2]*The number of Standard Deviations in the sample/by the Number of Levels [3]*the Standard Deviation), that is, 1.0+(1*6.0/3*0.5)=2.0. Using the same formula, the break point between medium and high would thus be 1.0+(2*6.0/3*0.5) =3.0.

Using this method, the three cities with the highest overall scores are Soc Trang, Vi Thanh and Uong Bi. The five cities with the lowest overall scores are Buon Ma Thuot, Bac Kan, Rach Gia, Ha Tinh, and Son La. Vi Thanh, a town in the Mekong Delta, was in the group of high scoring cities and towns for 8 out of 12 goals. Uong Bi and Soc Trang ranked in the top range for 7 out of 12 goals. and Long Xuyen and Thai Binh ranked in the highest levels for 5 goals each. Among the low scoring cities, Ha Tinh and Son La most frequently scored within the lowest level (8 out of 12) followed by Rach Gia, Bac Kan and Buon Ma Thuot (5 each).

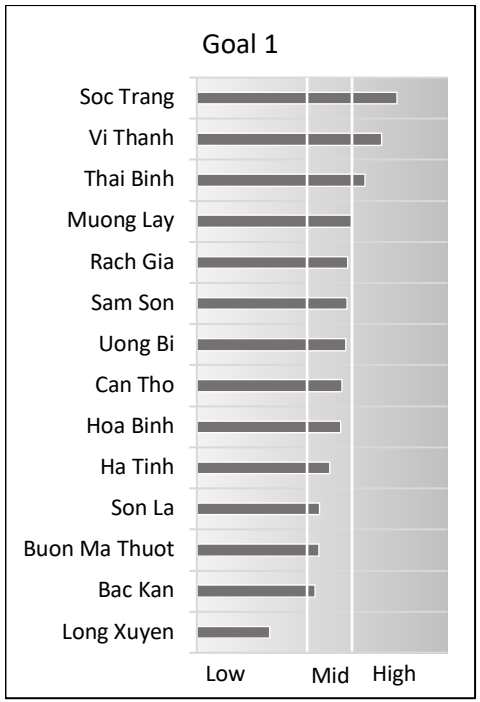


FIGURE 7. MINIMUM HUMAN VULNERABILITY

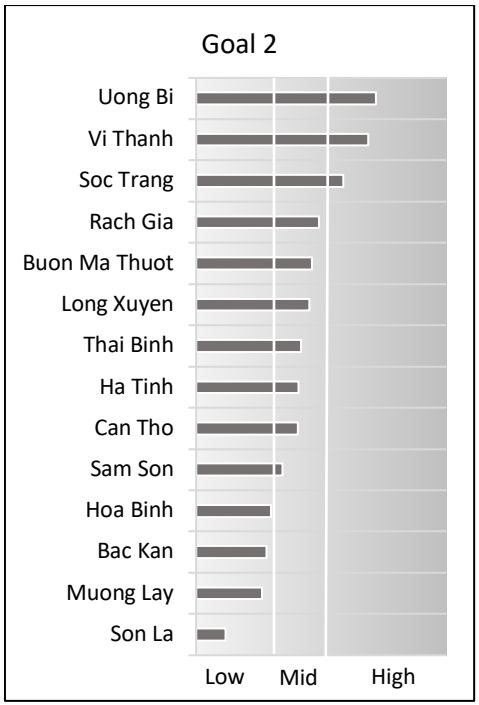


FIGURE 8. LIVELIHOOD AND EMPLOYMENT

Goal Rankings

In the section below, we present the rankings for each of the 12 goals. Each chart lists the cities and towns in order based on their resilience scores, from lowest to highest, and uses the formula noted above to determine break points between levels. Cities and towns that lack sufficient data for assessment appear in the charts for consistency though, in fact, no data (ND) is presented.

For Goal 1, *Minimum Human Vulnerability*, one city, Long Xuyen, the capital of An Giang province in the Mekong Delta, fell into the low category. Long Xuyen's position in the chart may reflect its relatively low quantitative scores for variables related to housing and sanitation, and low qualitative indicator score related to electricity. Three cities and towns fall into the high category, Thai Binh, Vi Thanh, Soc Trang and Nam Dinh. Thai Binh has relatively high quantitative and qualitative scores for all variables in this goal with the exception of its qualitative indicator for access to food after a natural disaster. Soc Trang and Vi Thanh pulled ahead of other cities based on the

quality and coverage of their electric, water supply and waste water treatment systems.

Four cities are in the low category for Goal 2, *Diverse Livelihood and Employment*. They are Son La, Muong Lay, Bac Kan and Hoa Binh. Muong Lay's score is pulled down by a relatively high poverty rate and unemployment rate (quantitative variables) and weak incentives for business (qualitative indicator). Bac Kan and Hoa Binh's scores are low in quantitative and qualitative metrics related to business. Son La has low scores for all metrics under this goal with the exception of its unemployment rate. The three cities and towns that score the highest under Goal 2 are Soc Trang, Vi Thanh and Uong Bi. Uong Bi's score is pulled up by programs that support businesses and households following a disaster, by a relatively high ratio of people with vocational training, and a low poverty rate. Soc Trang is pulled up by quantitative variables for poverty rate and women owned businesses and by its high qualitative scores related to labor. Vi Thanh, like Uong Bi, benefits from a relatively low unemployment rate and programs to support businesses and individuals following natural disasters. It also has a high qualitative score related to labor training.

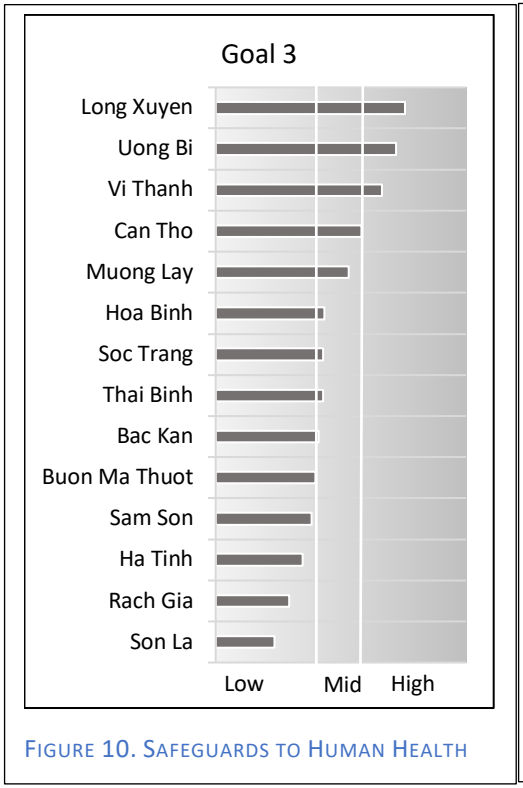


FIGURE 10. SAFEGUARDS TO HUMAN HEALTH

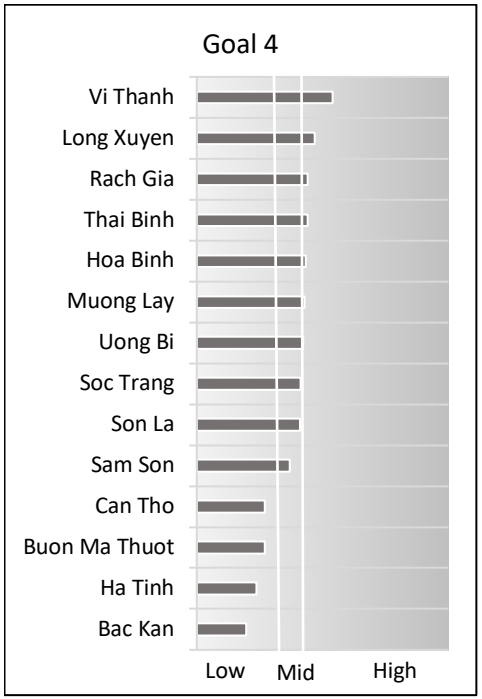


FIGURE 9. COLLECTIVE IDENTITY & SUPPORT

Four cities fall below the low-mid break point for Goal 3*, Safeguards to Human Life and Health*. They are Son La, Rach Gia, Ha Tinh and Sam Son. As noted earlier, Son La's quantitative and qualitative scores are generally low. The city's scores for this goal are no different. Ha Tinh's score is pulled down by low scores for all qualitative indicators. Sam Son's low score is represented primarily in its qualitative scores since it provided data for only one out of four quantitative indicators for this goal. Rach Gia's already low scores are pulled down further by a very low score for the variable related to preventative health programs. Vi Thanh, Uong Bi and Long Xuyen are in the highest group for this goal. Uong Bi, which has generally high scores, has low scores for one quantitative indicator: inclusive access to health services. Vi Thanh's score is pulled down by a very low score for the quantitative indicator "adequate resources for emergency health services." Long Xuyen's quantitative score for this goal is limited by different indicator, "adequate and inclusive access to healthcare".

With regard to Goal 4, *Collective Identity and Community Support*, four cities scored in the lowest range, Ha Tinh, Can Tho, Bac Kan and Buon Ma Thuot, and four scored in the highest, Vi Thanh, Long Xuyen, Rach Gia and Thai Binh. Among the low scorers, very low quantitative scores pulled down Bac Kan's

higher qualitative scores. Buon Ma Thuot's scores, which are generally near the middle range, were pulled down by a very low quantitative score for the indicator "distinct cultural identity," despite being a town within a province with a large ethnic population. Among the high scorers, Long Xuyen's generally low scores are pulled up by its qualitative scores for mutual support and its assessment of the role of private business in the community. Soc Trang's score is pulled up by high scores for a strong cultural identity. Soc Trang has a large Khmer population.

Ha Tinh, Can Tho, Muong Lay, Boun Ma Thuot and Son La all had low scores for Goal 5, *Security and the Rule of Law*. Like Goal 4, Goal 5 has a narrow standard deviation and a narrow middle range. For example, Ha Tinh's ranking is pushed down due to low scores for qualitative indicators related to crime prevention. Can Tho's scores are pulled down by a low quantitative score for accessible civil and criminal justice systems.

The high scorers for Goal 5, Thai Binh, Soc Trang, Vi Thanh, and Uong Bi, have been noted before. Vi Thanh, a small town in the Mekong Delta, scored very high with respect to qualitative indicators focused on crime prevention, emergency response, and access to legal aid, pulling up its overall score. Quantitative indicator scores for Uong Bi are fairly evenly distributed within their range. Soc Trang's ranking is pulled down by a low score for the quantitative indicator focused on access to legal aid.

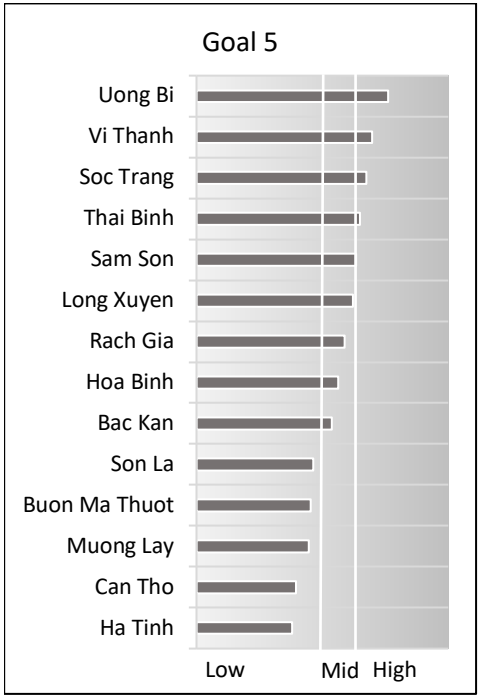


FIGURE 12. SECURITY AND RULE OF LAW

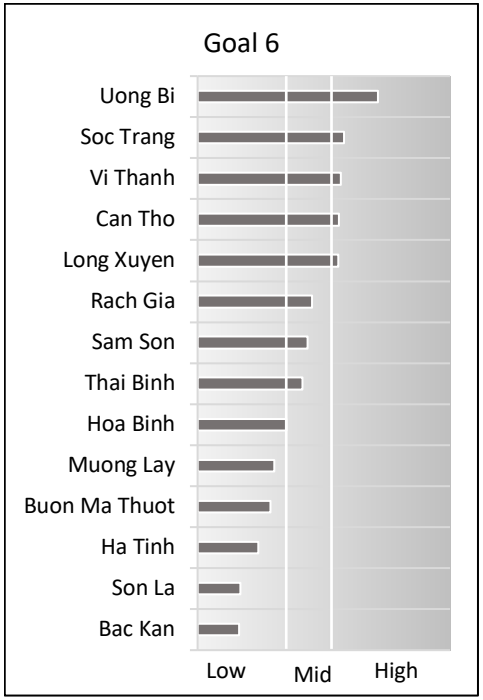


FIGURE 11. SUSTTAINABLE ECONOMY

Six cities and towns fall within the low range for Goal 6, *Sustainable Economy*. They are Bac Kan, Son La, Ha Tinh, Buon Ma Thuot, Muong Lay and Hoa BInh. Bac Kan, in particular, has very low scores for quantitative indicators related to a diverse local economy and attractive business environment. It has similarly low qualitative scores related to economic integration and competitiveness. Muong Lay has very low scores for quantitative indictors related to public finance and the business environment. The high scorers for Goal 6 include Long Xuyen, Can Tho, Vi Thanh, Soc Trang and Uong Bi. Uong Bi and Vi Thanh's scores are generally high and unremarkable. Soc Trang's ranking is pulled up by high scores for qualitative indicators related to public finance, economic competitiveness, and support for businesses following a shock and the quantitative indicator for public finance. Can Tho has mid to high scores for all qualitative and quantitative indicators under this goal. Its lowest score, 2.2, is for the qualitative indicator related to the business environment.

For Goal 7, *Reduced Exposure and Fragility*, Muong Lay, Can Tho and Long Xuyen are in the highest bracket. While Long Xuyen is among high scoring cities for 5 of the 12 goals, Muong Lay is in this bracket for four goals, Goal 7, 8, 11 and 12 and Can Tho is only in the upper bracket for Goals 6 and 7. Both Muong Lay and Can Tho deserve a closer look.

Muong Lay has been the focus of infrastructure development and household resettlement programs related to inundation caused by the construction of the Son La hydropower dam. The Son La dam, which began generating electricity in 2010, flooded most of the remaining rice growing land within the Da River watershed, including most of the rice growing land in Muong Lay. The town, which is a historic Thai settlement, was wiped out in a flash flood in 1990. Given its history of disaster, flooding and reconstruction, the later which is still ongoing, it should come as no surprise that the town's scores for all indicators related to reduced exposure and fragility are high. There is only one exception – the indicator related to ecosystem services which, at 2.9, is comparatively low. The town is surrounded by high mountains intersected with streams that are susceptible to flash flooding. Recent construction and clearing of hillsides have made these natural conditions worse.

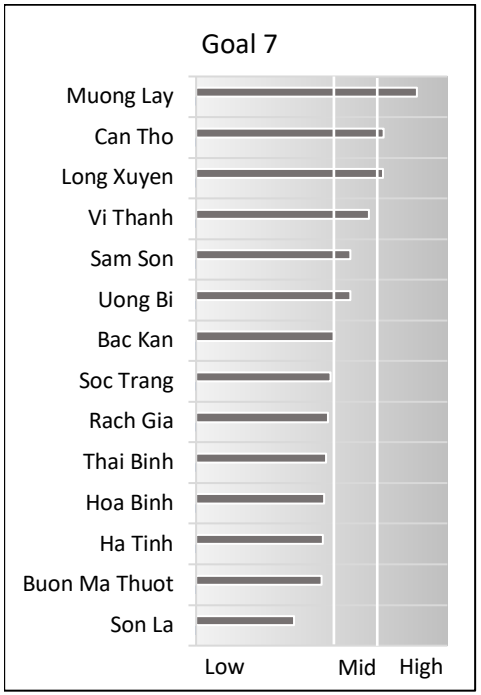


FIGURE 14. REDUCED EXPOSURE & FRAGILITY

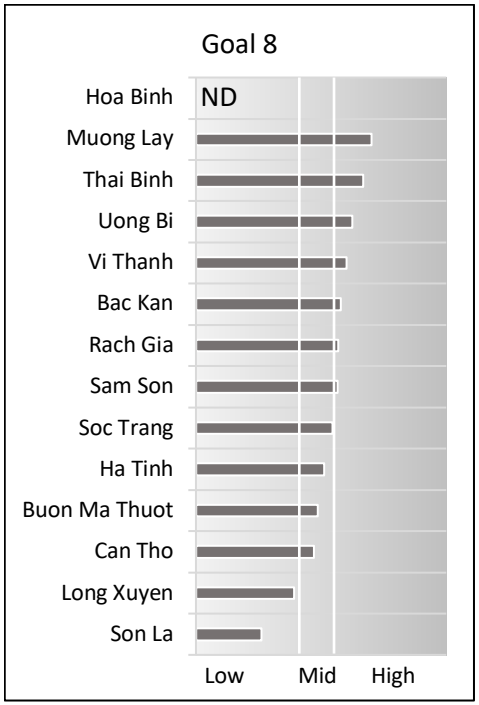


FIGURE 13. PROVISION OF CRITICAL SERVICES

Can Tho, the largest city in the Mekong Delta, is a 100 Resilient Cities (100RC) member city. The city's major threats are related to flooding, the erosion of embankments along rivers and canals, and the intrusion of salt water into surface water used for irrigation. The city has a master plan with a focus on these water-related threats. Thus, while Can Tho's scores for other goals are low- to mid-level, it stands out among other cities for its disaster readiness.

The lowest scores for Goal 8, *Provision of Critical Services*, fell to Son La and Long Xuyen. For Long Xuyen, which scored in the highest bracket for Goal 7, this reversal of fortune requires some explanation. Long Xuyen's low score is the result of very limited capacity for the city's hospitals to provide alternative sources of electricity and water during an emergency. These low scores are consistent in both quantitative and qualitative assessments. Muong Lay, Thai Binh, Uong Bi, Vi Thanh and Bac Kan are the high scorers for Goal 8. Possibly as a reflection on recent infrastructure investments, Muong Lay's score for this goal is pulled up by high scores for quantitative indicators for flexible, redundant water and electricity supplies, and continuity of those services during emergencies. Bac Kan's score was pulled up by one variable,

percent of domestic solid waste that is treated hygienically. Were it not for a high score in this variable, Bac Kan would have fallen into the mid-range.

For Goal 9, *Reliable Mobility and Communications*, which, like Goal 7 and 8 is within the *Infrastructure and Environment* dimension, both Muong Lay and Can Tho fall to the mid-level. The ranking for both is largely a reflection of their qualitative assessments as both Muong Lay and Can Tho provided limited quantitative data.

Among the other cities and towns ranked under Goal 9, Rach Gia, Sam Son, Ha Tinh and Son La rank in the lowest group. This is only the second time Sam Son is in the lowest group. Given that Sam Son is one of the best-known beach resort communities in Vietnam, a low score for mobility and communications is quite unexpected. In part, this is due to lack of data. Sam Son provided only three quantitative variables out of nine requested for this goal, and all scored in the lowest range possible. These indicators, however, suggest important infrastructure needs in the city.

- 9.1.1. Average maximum speed of driving motorbikes from the city center to the suburbs

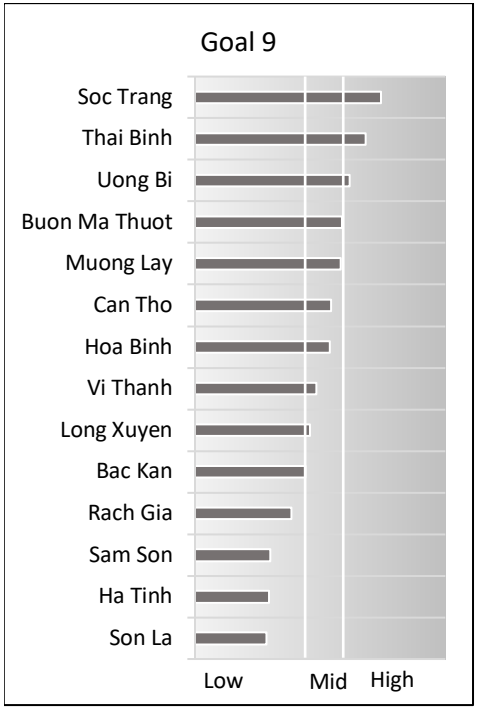


FIGURE 15. MOBILITY & COMMINICATION

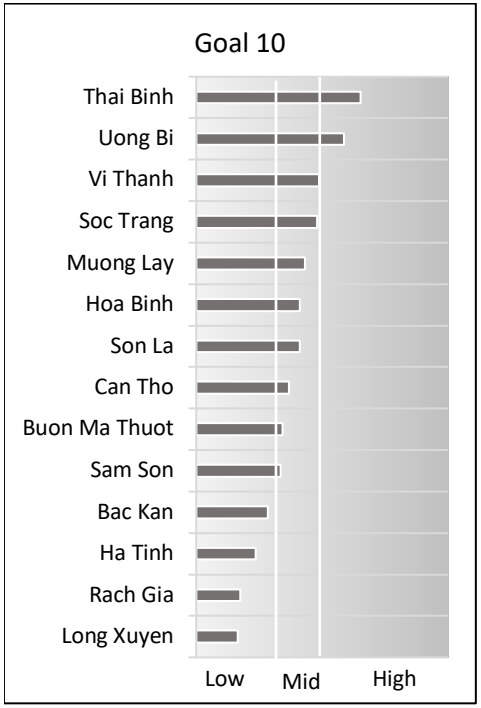


FIGURE 16. LEADERSHIP AND MANAGEMENT

- 9.2.1. Number of death caused by road accidents per 10,000 people in the city in the most recent year
- 9.2.3. Number of two-lane roads or larger out of the city to adjacent areas

Three cities and towns scored in the highest bracket for Goal 9: Uong Bi, Thai Binh and Soc Trang. Uong Bi's score could have been much higher but was pulled down by variable 9.2.3., the number of two-lane roads or larger out of the city to adjacent areas. This is largely a geographic issue. Uong Bi has a mountain range behind it and an estuary in front with only one coastal road connecting it to nearby cities and towns. Soc Trang, on the other hand, scored very high for the same variable. Soc Trang is a small city in the Mekong Delta with 7 two-lane roads reaching out to Can Tho, to the north, and farming communities in surrounding areas.

For Goal 10, *Leadership and Management*, two cities, Thai Binh and Uong Bi, are high scorers while four cities, Bac Kan, Ha Tinh, Rach Gia, and Long Xuyen are in the lowest bracket. Ha Tinh scored at or close to the lowest level possible for every quantitative variable for which data was provided.

- 10.2.1. Number of climate change related projects in the city that were jointly implemented by at least 2 partners in the government system in the most recent year
- 10.3.1. Percentage of major plan/policy decisions related to natural disaster response (storms, floods, droughts, earthquakes, etc.) made within the last year that included *interagency* consultations
- 10.4.1. For the city's primary natural hazard, how many of the following actions has the city or province taken: scientific study, community consultations, real-time monitoring, disaster preparedness training for people in vulnerable areas, use of media to alert citizens in case of emergency.
- 10.4.2. Number of disaster risk assessments of the city conducted by related stakeholders in the last two years
- 10.5.1. Percentage of government staff that participated in emergency response practice training in the last 5 years
- 10.5.3. Number of times the cross-sectoral emergency response strategy of the city was reviewed in the past 5 years
- Number of emergency drills organized by many emergency response forces in the city jointly in the most recent year

Most of Ha Tinh's qualitative scores are in the mid-range.

Rach Gia's low ranking, like Ha Tinh's, reflects a combination of mid to low qualitative indicator scores, and very low quantitative scores. In Rach Gia's case, this includes low scores for variables related to robust decision making by municipal government, effective coordination with the city's agencies, constructive collaboration between all actors, and comprehensive hazard monitoring and risk assessment.

Among the high scorers, Uong Bi's ranking was pulled down by infrequent disaster risk assessments. This should be a red flag for the city which is the site of a 2015 disaster in which waste from a coal mine descended into residential areas during a prolonged period of heavy rain. Uong Bi's only risk assessment seems to have *followed* that disaster.

For Goal 11, *Empowered Stakeholders*, Rach Gia, a small town in the Mekong Delta, on the coast of the Gul of Thailand, has skewed all other rankings but its exceptionally low scores. It has provided only one quantitative variable, percentage of university graduates in its labor force (3%), and all of its scores for qualitative indicators related to education, disaster risk management, cooperation between citizens and government are exceptionally low. At the other end, six cities and towns are in the highest bracket. This includes Thai Binh, Muong Lay, Vi Thanh, Uong Bi, Soc Trang, and Ha Tinh.

Thai Binh, the city with the highest score for Goal 11, has very high qualitative scores and very high scores for all quantitative variables provided, including high school completion rate for girls, adult literacy rate, percent of population with university degrees, and percent of wards and communes with disaster risk management plans. Ha Tinh, which inched its way into this category, provided only one quantitative data point, percent of wards and communes that have a disaster risk management plan, which, at 100 percent, put it into the highest bracket. Its qualitative indicator scores, however, are at the low and mid-level. Ha Tinh is the site of Formosa Steel, a notorious facility with a history of environmental violations that have erupted into mass protests both in the city and across the country. The qualitative scores reflect an ambivalence between the city's role in protecting its citizens from disasters, which it failed, and their right to protest, which has succeeded in raising attention to the problems they face.

Goal 12, *Integrated Development Planning*, Son La and Ha Tinh are in the lowest bracket and three cities, Long Xuyen, Vi Thanh and Uong Bi stand out in the highest bracket. The qualitative indicators for this goal measure integration of climate and hazard assessments into urban planning, stakeholder participation in planning processes, the quality of land use plans, and interagency consultation. Ha Tinh's generally high scores for these indicators are pulled down by a very low score for the first, integration

of climate and hazard assessments into urban planning. Its quantitative indicator scores are generally low with the exception of 12.4, transparent plan approval process. This indicator is assessed by the rate of new construction that is permitted (reported at 98%) and the percent of development plans posted on the province's website (reported at 60%). All other quantitative variables under this goal are relatively low, including those measuring consultation processes, with this indicator receiving a relative score of 1.2. At the upper end, Muong Lay has relative high scores for all quantitative and qualitative indicators with the exception of two: comprehensive city monitoring and data management, and the appropriateness of zoning and land use plans. For the former, Mung Lay provided data for one quantitative variable: the percent of residences in danger of flooding. At 30 percent, this variable had a relative score of 1.0, the lowest possible, which is consistent with the town's history and location in the inundation zone of the Son La dam. Its score for land use planning, like many cities in this study, is pulled down by a relative lack of green space within the inner city. A quick look on Google Earth reveals that resettlement areas are composed of tightly packed houses which, while intersperse with trees, lack public green space. Long Xuyen had the highest overall score for this goal, 4.0. Long Xuyen, a city on the Hau Giang River, a branch of the Mekong, has relatively little green space within the city. As noted above, lack of green space is a factor influencing the scores of many cities and towns in this index. The city did not provide data, such as percentage of residences in areas prone to flooding that could have pulled its ranking down.

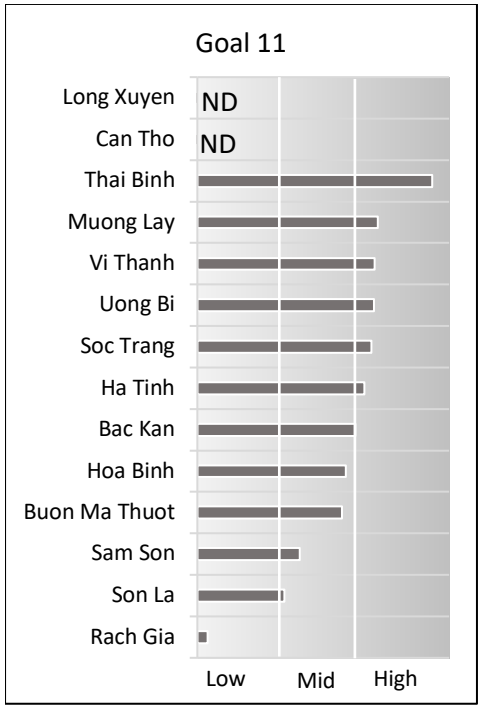


Figure 17. Empowered Stakeholders

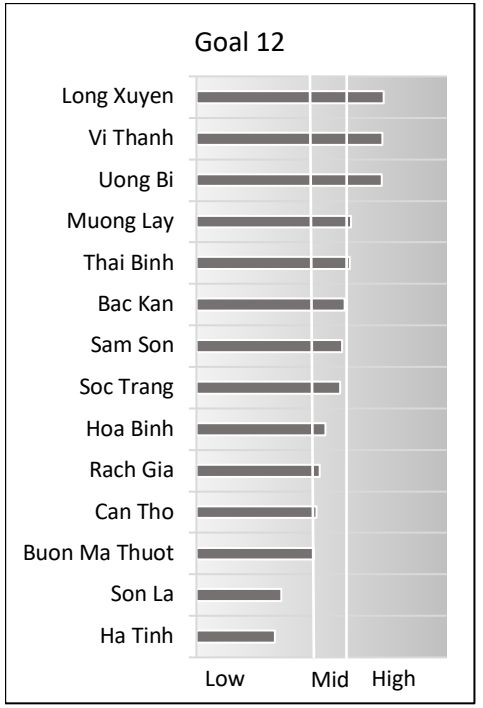


Figure 18. Integrated Development

Summary

This overview of city rankings should make clear why and overall city ranking would be possible, but also inappropriate. Each city has unique geographies, histories, external and internal factors affecting it but beyond its control, priorities, weaknesses, failures and successes. Taken together, these factors produce high scores that lift a particular city or town up in the ranking, and low scores that pull it down. The value of this index is to point to those factors influencing a city's score for each goal and using that information for further investigation.

The rankings are also valuable as a means for cities to compare themselves to others. For example, what has Uong Bi, a district sized city facing an estuary, backed by a mountain range, whose major industry is coal mining and electrical generation, score high in 7 out of 12 goals? Why does Son La,

an ethnic minority town nestled in hills atop a plateau in the mountains of northwest Vietnam score low in 8 out of 12 goals? In this idyllic setting, one might expect higher scores as, for example, Vi Thanh, a small town in the Mekong Delta. What has Vi Thanh or Soc Trang, which both face problems related to sea level rise, over draught of groundwater, and reduced freshwater flows in the Mekong, do right?

In part, the answer lays in the measurement tools. The VNCRI provides a comprehensive assessment rather than one focused on particular problems. A problem based approached might have highlighted Uong Bi, which suffered a coal waste landslide during an extended period of heavy rain, as a focus of intervention. In part, the answers also lay in the data provided. In many cases above, a low or high score for a particular variable pulled cities up or down in the rankings. Identifying these key variables, as has been done above, offers opportunities for interventions that may not be obvious from a problem center approach.

City Snapshots

The city snapshots included in the appendix offer a quick look at the results of data collection in 14 cities within this study. In each case, the quantitative and qualitative scores for each of the 12 goals for each city is compared with both the averages and to each other. The commentary focuses on divergences between quantitative and qualitative scores and the averages. These observations offer an opportunity to speculate on underlying strengths and weaknesses in each city. The snapshots, which supplement the rankings provided above, are included in the appendix.

Guidelines for Replication

We approach recommendations for replication with an awareness that, while we know what didn't work, we can only intuit what might have been possible. Hindsight is not always 20-20. Sometimes, however, a systematic review offers a way through that fog.

From the perspective of hindsight, Arup's CRF and CRI lacks some key quantitative indicators and variables that could alter the outcomes of city assessments and rankings. Those missing elements were carried over to the VNCRI. For example, the CRI does not provide a means of assessing current environmental conditions, such as air quality, surface water quality and groundwater over draught, nor does it include indicators or variables that signify efforts to reduce carbon emissions, such as renewable energy sources or energy efficiency programs. Furthermore, in most cases, the city is treated as a whole and where differentiation may exist, as in water supply, waste collection, or housing, this is presented as a percentage of the population or housing units, not in terms of the city's area. Spatial differentiation is a growing element of Asian cities as populations self-segregate based on housing quality, services, and schools, and as gated communities become more common. Spatial segregation plays havoc with a host of issue related to public services, including public education, attitudes regarding taxation for public services, local governance and community identities.

Keeping these missing elements in mind, any organization wishing to replicate the VNCRI in their own country contexts needs to consider three related issues. First, it must determine whether the goal is to use the VNCRI or CRI to develop a *comprehensive city resilience index* or to use these resources to develop a *bespoke index* focused on the needs of a particular sector or ministry. Second, those wishing to replicate the VNCRI will need to consider incentives for participating cities and towns. The incentives in VNCRI's pilot phase were clear. Each city created a resilience strategy, including a participatory risk assessment, through the training and data collection process. The incentives for participation in data collection during the rollout was less clear. While cities and towns welcomed the opportunity to participate in trainings that resulted in drafting of their own resilience strategies, participation in a national comparative city resilience survey

which provided less detailed results for individual cities offered less incentive for participation. Third, replicators will need to consider the level of cities and towns they wish to assess. Each country will have its own data administration framework. As we discovered in Vietnam, only provincial cities had the authority to generate and distribute their own data. For smaller towns, data needed to be requested from provincial authorities, creating another level of requests that limited our ability to collect full sets of data.

The VNCRI experience

This project began with an effort to create a bespoke index based on Arup's City Resilience Framework (CRF) using the authority of the Ministry of Construction's Urban Development Agency to request data from cities and provinces. The accommodations that were made during this project pushed the VNCRI more in the direction of adapting the Arup's City Resilience Index (CRI), published after the project began, than originally anticipated. The result is a comprehensive city resilience index that has a clear interest in construction and planning. As such, the VNCRI is neither a bespoke index focused only on the needs of the MoC, nor is it the comprehensive index developed by Arup. However, as seen from the results of this project, the VNCRI is a useful tool for city level resilience assessment and comparison.

But what if the core group had maintained its desire to use the CRF (rather than the CRI) as its model? Could a bespoke VNCRI tailored to the needs of UDA have achieved better outcomes? While it may no longer have been a measure of overall resilience, a simplified VNCRI oriented to the needs of UDA may have been easier to administer. Including a participatory risk assessment would have also offered a tangible outcome to cities and provinces. How would this work?

Many of the insights garnered from this project emerged out of the pilot phase. These include:

- the positive role played by the Vietnam Urban Planning and Development Association (VUPDA) in gathering participants, organizing trainings, and bridging administrative divisions
- the value of learning through trainings, participatory risk assessments and development of city profiles and resilience action plans
- the difficulty in establishing quantitative proxy variables for the CRF indicators that are both appropriate and available, and once determined, the difficulty collecting them from institutions other than that of focal points in the DoC
- the learning value of the scenarios and relative ease in application
- the impossible logistics of assembling senior level officials for the rollout trainings in a limited number of locations and dates
- the limited authority of UDA under D2623

Given these insights, what could we have done better? *First*, the core group could have remained firm in aligning the VNCRI with the needs of UDA. While D2623 did not provide the authority needed to guarantee cooperation by local assessors, UDA's other mandates, including its role in the categorization of cities and development of national urbanization strategies, provide a focus for the VNCRI that overlaps with the goals of the CRF. The resulting index would have not been an index of overall city resilience, as is the CRI, but it would have served a positive role as a bespoke index based on the CRF within MoC's mandates. *Second*, while the pilot phase of the project was important both for the cities involved and for development of the VNCRI, this component of the project would not have to be repeated in replications of the VNCRI. This more intensive approach could, however, remain an *added incentive* for cities interested in developing their own city profiles and action plans. *Third*, VUPDA's positive role in the pilot phase is well documented. Given a stronger focus on urban planning and development in the VNCRI, VUPDA could have played a more active role in developing the qualitative survey, with the association's 4,000 members

serving as the community of respondents. Granted, VUPDA's membership is not evenly distributed across the country, but given its networks of relationships within architecture and planning and close ties to related associations in architecture, construction and civil engineering, a representative sample of professionals who have worked in the target cities could have been developed. Other organizations interested in replicating the VNCRI might consider how they can involve business and professional organizations in the qualitative assessments. *Fourth*, a greater spatial focus in the quantitative variables, including the use of census data, GIS and participatory risk assessments, would have made the VNCRI more useful to the needs of UDA and MoC by offering a view into the internal dynamics of cities. The VNCRI missed this opportunity when the core group began to focus on the CRI's 156 variables and 156 scenarios. *Fifth*, the rollout trainings were under-budgeted and poorly conceived. If they had been approached as an ongoing process rather than the conclusion of a sequence of activities, more time could have been spent creating working groups at the city level, introducing resilience concepts in a larger number of regional workshops, conducting participatory risk assessments, and developing local resilience databases. Logistically, organizing these trainings would still remain difficult, but by initiating them earlier, more time could have been spent on learning before data was requested. *Finally*, the PCI stands as a benchmark index in part due to its reliability and in part due to the way it is heralded in the press and in the annual presentations of results. Future iterations of the VNCRI should learn from the PCI's effective use of communications. Not only are the annual rankings featured and discussed in the press, but the methodology, reports and databases are available for review and download online.

Now consider an alternative approach. What if an organization wished to retain a comprehensive approach to city resilience? How could the incentive and data collection issues be resolved? Six important elements emerge out of experience implementing the VNCRI, some of which have already been noted regarding the bespoke approach. *First*, determining the level of city to be included in the index is key to facilitating data collection and limiting the number of cities in the national index. Each country has its own levels of authority for city level government to collect and distribute a variety of types of data. In every case, applying the VNCRI to a level of city administration that has and can provide data will reduce bureaucratic boundaries by leveling data sources under the authority of one city administration. *Second*, while the authority of city level administrations will be important for the collection of data, a national level authority may still be required. Under Vietnam's decentralized system of public administration, unless a project is authorized and funded by the central government, city and provincial authorities may view their participation as low priority relative to the work required by local authorities. Thus, while the General Statistical Office of Vietnam might be able to provide an experienced approach to data collection, without the authority of the central government behind it, even the GSO will have difficulty collecting data. Countries with a less decentralized system may find it easier to work through a national authority like the GSO. *Third*, as noted with regard to a bespoke approach, greater time and effort should be placed on building teams at the city and province levels. To do so will likely require the training of trainers and perhaps the participation of professional associations. The goal would be to introduce the project to each city, create teams as early as possible, conduct local trainings related to city resilience, create regional groupings to facilitate larger trainings, to present city level and national comparative uses of city resilience data before data collection begins, and to use regional groupings to determine the availability of data. *Fourth*, replicators of the VNCRI would be well advised to create multiple levels of incentives. These incentives could be presented as training options or options of particular uses of the data. As the VNCRI pilot phase made clear, cities had an incentive

to use the data generated through the VNCRI to create their own resilience plans. This use of the data can be presented as a follow-up option. Other cities may be more interested in training, which can be included in preparation for rollout. *Fifth*, online data access with opportunities to revise is a crucial element in collecting and verifying data. Access can be limited to local team members who can edit their own data and read the data of other cities. Errors can easily creep into the data set and the ability to see what others have added gives cities an opportunity to assess their own data. For example, there were many errors related to denominators in the VNCRI that could have been resolved more easily through an online database that tracked versions. The online database can also be linked to worksheets that normalize the data, group it by city, goal and indicator, rank the groupings by city, and chart the results. Data collection teams, however, should not be able to see these results until data is collected and verified since there would be incentive to manipulate data for higher rankings. Once completed, however, these online worksheets offer both access to results and transparency in calculations. *Sixth*, reporting should be clear and informative, and communications should culminate in a major event. A comparative national index like the VNCRI can best be used to identify both positive and negative outliers within an individual city's data, and in the rankings of all cities in the data set. Within the VNCRI, we have compared qualitative and quantitative goals and indicators against each other and against the averages, and we have identified particular quantitative variables that have influenced city rankings. In many cases, we have also conducted online research, including Google Earth satellite image analysis, to add context to these outliers. Online searches can also be used to confirm or refute survey results. All of these options can be used to unpack the data and develop a coherent narrative. Those narratives highlighting outliers can be presented in a well-organized and publicized event. Our model is the Provincial Competitive Index whose annual event is attended by key members of government and the donor community and widely reported in the press. Documentation is also well organized online with both reports and searchable databases available.

Final comments

Despite issues with data collection and verification, a slow drift from bespoke adaptation of the CRF to adaptation of a more comprehensive CRI, issues regarding incentives for city level participation, and data inconsistencies, results suggest that creation of a national comparative city resilience index, like the VNCRI, is both useful and possible. Rankings offer opportunity to assess outliers that reflect city level strengths and weaknesses and emphasize the point that resilience is contextual. Geography, culture, economy, history, infrastructure, leadership, and many other factors affect a city's capacity to respond to shocks and stresses. Rather than becoming obscured by comparative ranking, a focus on outliers makes these particular conditions clearer. Replication of the VNCRI in most country contexts is possible following the suggestions noted above. The effort will be rewarded with a robust means of tracking city level resilience over time as both the relative rankings change, and the underlying data improves.

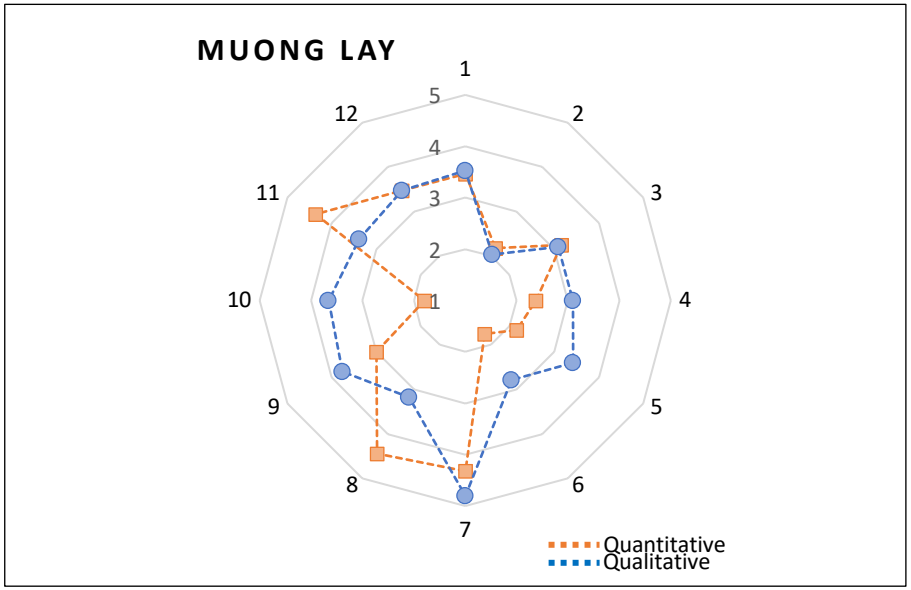
Appendix 1: City Snapshots

Mường Lay:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.5	5/5	3.1	3.5
2. Diverse livelihood & employment	8/10	2.6	2.2	6/6	2.7	2.0
3. Effective safeguard to human health & life	6/7	3.0	3.2	4/4	2.8	3.1
4. Collective identity & community support	3/5	2.2	2.4	4/4	2.9	3.1
5. Security & rule of law	7/8	3.2	2.1	3/3	3.3	3.4
6. Sustainable economy	5/7	2.5	1.7	5/5	2.9	2.8
7. Reduced exposure & fragility	6/6	3.6	4.3	4/4	3.0	4.8
8. Effective provision of critical services	6/8	3.0	4.4	5/5	3.1	3.2
9. Reliable mobility & communications	2/8	2.7	3.0	4/4	3.3	3.8
10. Effective leadership & management	5/7	1.9	1.8	5/5	3.2	3.7
11.Empowered stakeholders	3/4	3.5	4.4	3/3	3.1	3.4
12. Integrated development planning	6/7	3.6	3.5	4/4	2.9	3.5

Commentary

Muong Lay's scores for reduced exposure (7), provision of critical services (8), and empowered stakeholders (11) are well above the average for other cities. Its qualitative scores for collective identity (4), reduced exposure (7) and integrated development planning (12) are also above average. At the same time, its quantitative scores for security (5) and sustainable economy (6) are well below average, as is its qualitative score for diverse livelihood and employment (2). The town's quantitative and qualitative metrics fairly well match with regard to vulnerabilities (1 - middle score) livelihoods (2 - low score), reduced exposure (7 - high score) and safeguards to health (3 – middle score). Its metrics diverge for collective identity (4 – high qualitative), critical services (8 – high quantitative) and leadership (10 - high qualitative). The data presented here suggests that the city is doing better than others protecting its citizens and infrastructure, but not so well in diversifying and sustaining its economy. The large divergences also suggest that the assessors may be overrating the town's collective identity (4) and leadership capacity (10).

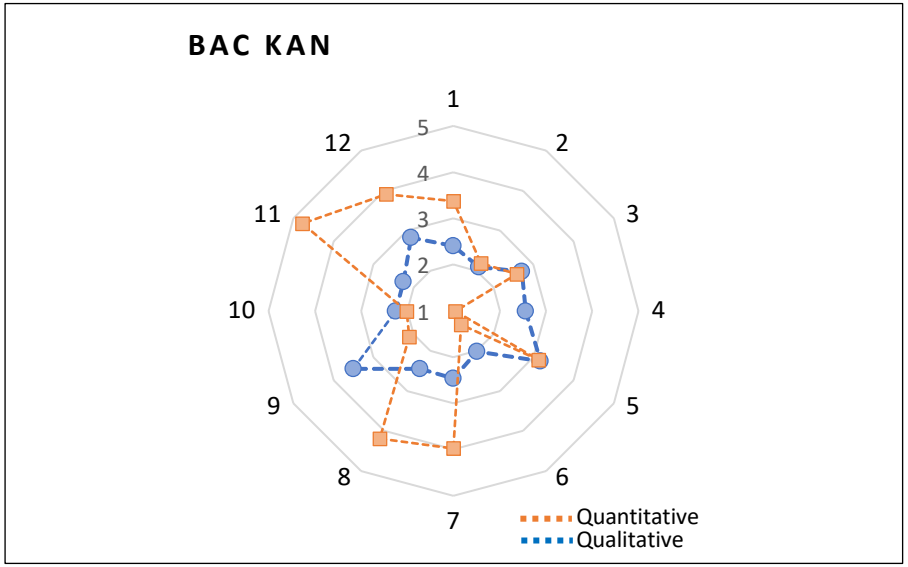


Bắc Kạn:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.4	5/5	3.1	2.4
2. Diverse livelihood & employment	7/10	2.6	2.2	6/6	2.7	2.1
3. Effective safeguard to human health & life	4/7	3.0	2.6	4/4	2.8	2.7
4. Collective identity & community support	2/5	2.2	1.0	4/4	2.9	2.5
5. Security & rule of law	5/8	3.2	3.1	3/3	3.3	3.2
6. Sustainable economy	3/7	2.5	1.3	5/5	2.9	2.0
7. Reduced exposure & fragility	5/6	3.6	4.0	4/4	3.0	2.4
8. Effective provision of critical services	5/8	3.0	4.2	5/5	3.1	2.4
9. Reliable mobility & communications	3/8	2.7	2.1	4/4	3.3	3.4
10. Effective leadership & management	6/7	1.9	2.0	5/5	3.2	2.2
11.Empowered stakeholders	2/4	3.5	4.8	3/3	3.1	2.3
12. Integrated development planning	6/7	3.6	3.9	4/4	2.9	2.8

Commentary

Bac Kan's scores for provision of critical services (8) and empowered stakeholders (11) are well above the average for other cities. The quantitative score for reduced exposure & fragility (7) is to some extent above the average. However, for its qualitative scores, only the one for reliable mobility (9) is slightly higher than the average while all the other metrics are lower. Its quantitative scores for vulnerability (1), collective identity (4) and sustainable economy (6), exposure (7), provision of critical services (8), leadership (10), and empowered stakeholders (11) are all well below average. The town's quantitative and qualitative metrics only match with regard to livelihoods (2 - low score), safeguards to health (3 – medium score), security (5 – high medium score), and 10 (leadership – low score). On contrary, the city's metrics diverge for vulnerability (1 – high quantitative), collective identity (4 – low quantitative), reduced exposure and critical services (7 & 8 – high quantitative), reliable mobility (9 – high qualitative), empowered stakeholder (11 – very high quantitative), and integrated planning (12 – high quantitative). The data presented here suggests that the city is doing better in dimensions related to infrastructure system and leadership and strategy, but not so well at employment and livelihood opportunities. The large divergences also suggest that the assessors may be underrating the town's natural and man-made infrastructure systems (7 – reduced exposure & fragility, and 8 – effective provision of critical services) and leadership capacity (11 – empowered stakeholders), while however overrating the transportation and communication networks and systems (9 – reliable mobility and communication).



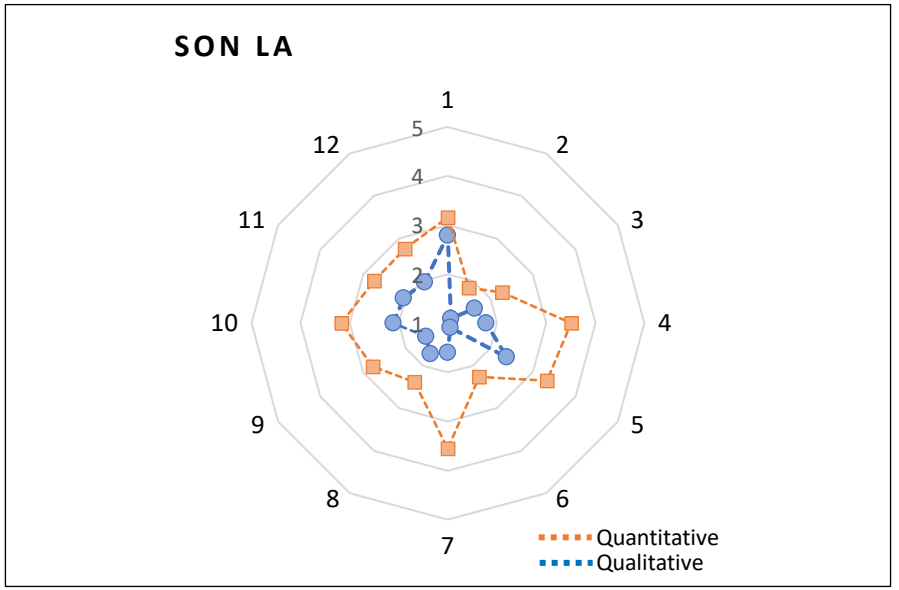
Sơn La:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.2	5/5	3.1	2.8
2. Diverse livelihood & employment	10/10	2.6	1.8	6/6	2.7	1.1
3. Effective safeguard to human health & life	5/7	3.0	2.3	4/4	2.8	1.6
4. Collective identity & community support	5/5	2.2	3.5	4/4	3.3	1.8
5. Security & rule of law	8/8	3.2	3.3	3/3	3.3	2.4
6. Sustainable economy	6/7	2.5	2.3	5/5	2.9	1.1
7. Reduced exposure & fragility	6/6	3.6	3.6	4/4	3.0	1.6
8. Effective provision of critical services	8/8	3.0	2.4	5/5	3.1	1.7
9. Reliable mobility & communications	7/8	2.7	2.8	4/4	3.3	1.5
10. Effective leadership & management	7/7	1.9	3.2	5/5	3.2	2.1
11.Empowered stakeholders	4/4	3.5	2.7	3/3	3.1	2.0
12. Integrated development planning	7/7	3.6	2.7	4/4	3.5	2.0

Commentary

Son La's scores for collective identity (4) and effective leadership & management (10) are much higher than the average for other cities. However, while the quantitative scores for livelihood (2), safeguards (3), critical services (8), empowered stakeholders (11), and integrated planning (12) are below the average, all of its qualitative scores are below the average. More specifically, the qualitative scores for diverse livelihoods (2) and sustainable economy (6) are very low compared to the average of the other cities.

This is the only city in which each of the qualitative scores is lower than its corresponding quantitative one. The data presented here suggests that the city is doing better than others protecting its citizens and infrastructure and providing services, but not so well in developing and sustaining the economy. The divergences, described in detail in the result report, also suggest that there are qualitative issues behind that data that need deeper consideration.

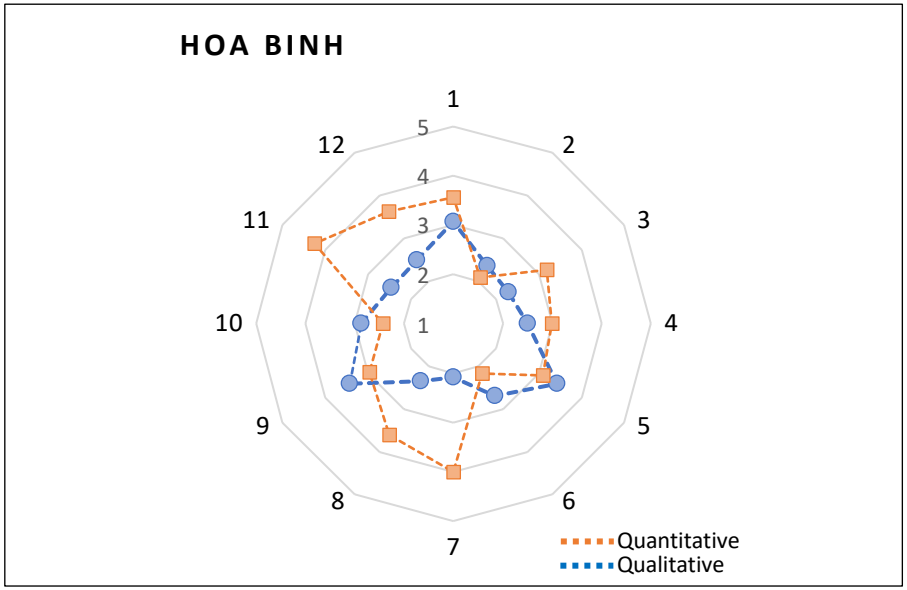


Hòa Bình:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	3.6	5/5	3.1	3.0
2. Diverse livelihood & employment	10/10	2.6	2.1	6/6	2.7	2.3
3. Effective safeguard to human health & life	7/7	3.0	3.2	4/4	2.8	2.3
4. Collective identity & community support	5/5	2.2	3.0	4/4	2.9	2.5
5. Security & rule of law	7/8	3.2	3.1	3/3	3.3	3.4
6. Sustainable economy	6/7	2.5	2.2	5/5	2.9	2.7
7. Reduced exposure & fragility	6/6	3.6	4.0	4/4	3.0	2.1
8. Effective provision of critical services	7/8	3.0	3.6	5/5	3.1	2.3
9. Reliable mobility & communications	5/8	2.7	3.0	4/4	3.3	3.3
10. Effective leadership & management	5/7	1.9	2.4	5/5	3.2	2.9
11.Empowered stakeholders	4/4	3.5	4.3	3/3	3.1	2.5
12. Integrated development planning	7/7	3.6	3.6	4/4	2.9	2.5

Commentary

Hoa Binh's quantitative scores for collective identity (4), provision of critical services (8), effective leadership (10), and empowered stakeholders (11) are higher than the average for other cities. Its quantitative score for diverse livelihoods (2) is well below the average, while its scores for security (5) and sustainable economy (4) are somewhat lower than the average. The city's qualitative scores, however, are mostly equal to or lower than the averages, except for security (5). The town's quantitative and qualitative metrics only match with regard to livelihoods (2 - low score), security (5 – medium-high score), reliable mobility (9 – medium score) and Effective leadership (10 – medium score). On the contrary, its metrics diverge for safeguards (3 – high quantitative), reduced exposure (7 – high quantitative), critical services (8 – high quantitative), empowered stakeholder (11 – very high quantitative), and to a large extent, integrated planning (12 – high quantitative). The data presented here suggests that the city is doing better in the goals related to infrastructure systems and the leadership and strategy, yet not so well at employment and sustainable economy. The large divergences also suggest that the assessors may be underrating the town's infrastructure system (7 – reduced exposure & fragility), and health service (8 – effective provision of critical services).

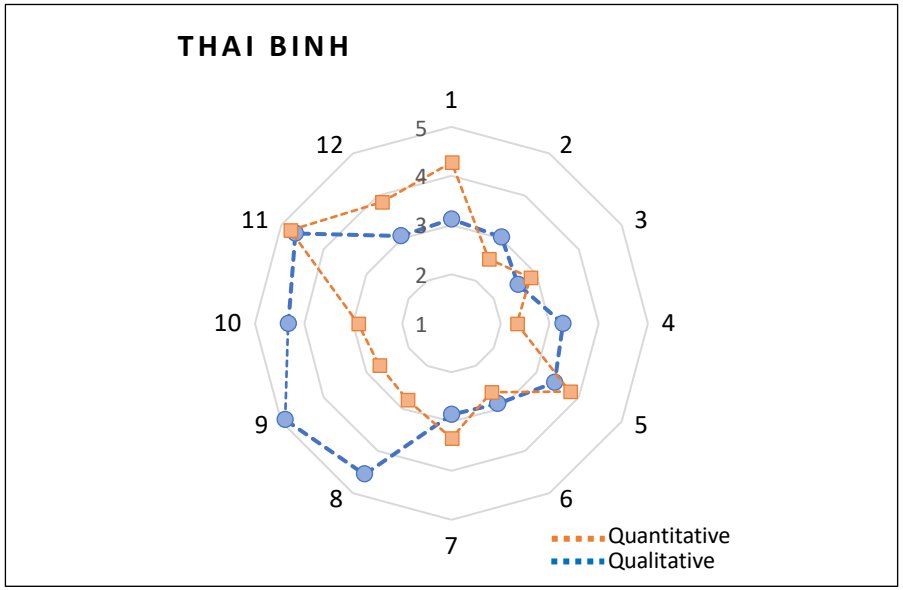


Thái Bình:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	4.3	5/5	3.1	3.1
2. Diverse livelihood & employment	10/10	2.6	2.5	6/6	2.7	2.8
3. Effective safeguard to human health & life	7/7	3.0	2.9	4/4	2.8	2.6
4. Collective identity & community support	5/5	2.2	2.3	4/4	2.9	3.2
5. Security & rule of law	7/8	3.2	3.8	3/3	3.3	3.4
6. Sustainable economy	6/7	2.5	2.6	5/5	2.9	2.7
7. Reduced exposure & fragility	6/6	3.6	3.3	4/4	3.0	2.8
8. Effective provision of critical services	8/8	3.0	2.8	5/5	3.1	4.5
9. Reliable mobility & communications	7/8	2.7	2.7	4/4	3.3	4.8
10. Effective leadership & management	6/7	1.9	2.9	5/5	3.2	4.3
11.Empowered stakeholders	4/4	3.5	4.8	3/3	3.1	4.7
12. Integrated development planning	7/7	3.6	3.8	4/4	2.9	3.1

Commentary

Thai Binh's scores for vulnerability (1), security (5), effective leadership (10), and empowered stakeholders (11) are well above the average for other cities. Its qualitative scores for provision of critical service (8), reliable mobility & communications (9), leadership (10), and empowered stakeholders (11) are also well above the average. Meanwhile, the city's other quantitative and qualitative scores are generally equal to the average. The city's quantitative and qualitative metrics fairly well match with regard to livelihoods (2 - medium score), safeguard (3 – medium score), security (5 – high medium score), sustainable economy (6 – medium score), reduced exposure (7 – high medium score) and empowered stakeholders (11 – very high score). Its metrics diverge for vulnerability (1 – high quantitative), collective identity (4 – high qualitative), provision of critical services and reliable mobility & communication (8 & 9 – significantly high qualitative), and leadership (10 - high qualitative). The data presented here suggests that the city is doing better than others in terms of public security, infrastructure, leadership, and planning, but not so well in job opportunity, diversifying and nourishing its economy, and social adherence among different groups of population. The large divergences also suggest that the assessors may be overrating the town's provision of critical services (8), reliable mobility and communication (9), and leadership capacity (10).

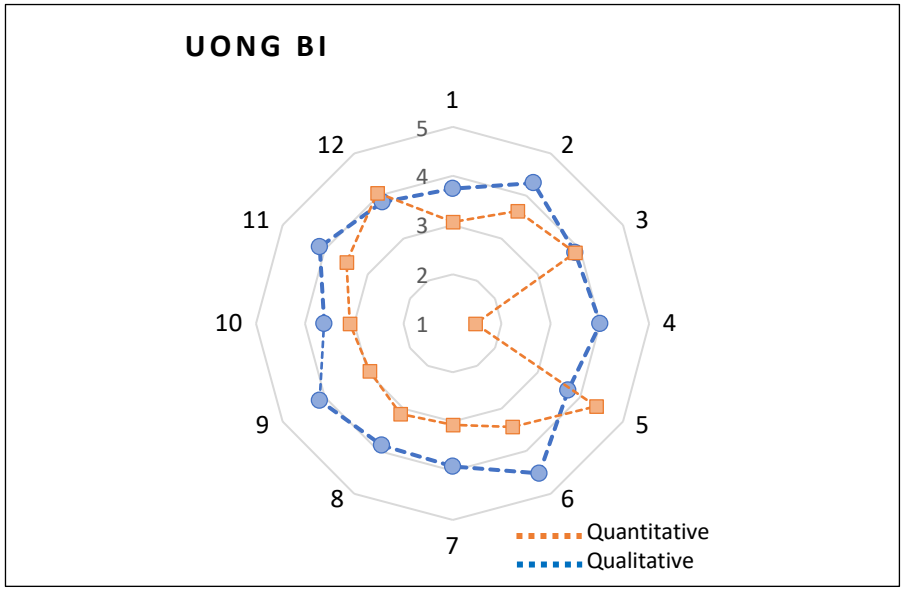


Uông Bí:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	3.1	5/5	3.1	3.7
2. Diverse livelihood & employment	10/10	2.6	3.6	6/6	2.7	4.1
3. Effective safeguard to human health & life	7/7	3.0	3.9	4/4	2.8	3.9
4. Collective identity & community support	5/5	2.2	1.5	4/4	2.9	3.9
5. Security & rule of law	5/8	3.2	4.4	3/3	3.3	3.7
6. Sustainable economy	6/7	2.5	3.4	5/5	2.9	4.3
7. Reduced exposure & fragility	6/6	3.6	3.1	4/4	3.0	3.8
8. Effective provision of critical services	7/8	3.0	3.1	5/5	3.1	3.9
9. Reliable mobility & communications	5/8	2.7	2.9	4/4	3.3	4.0
10. Effective leadership & management	7/7	1.9	3.1	5/5	3.2	3.6
11.Empowered stakeholders	4/4	3.5	3.5	3/3	3.1	4.1
12. Integrated development planning	7/7	3.6	4.1	4/4	2.9	3.9

Commentary

Uong Bi's scores for diverse livelihood (2), safeguards (3), security (5), sustainable economy (6), and leadership (10) are well above the averages for other cities. In addition, most of its qualitative scores including livelihood (2), safeguards (3), collective identity (4), sustainable economy (6), reduced exposure (7), provision of critical services (8), mobility and communications (9), empowered stakeholders (11), and integrated planning (12) are higher than the averages. Only the quantitative scores for vulnerability (1), collective identity (4), and reduced exposure (7) are somewhat lower than the averages. The town's quantitative and qualitative metrics fare very wide apart only for collective identity (4 – low quantitative). The data presented here suggests that the city is doing the best among the roll-out cities by having most of its scores higher than the average, for both quantitative and qualitative ranking. The only divergence may suggest that the assessors may overrated their city's collective identity & community support (4).

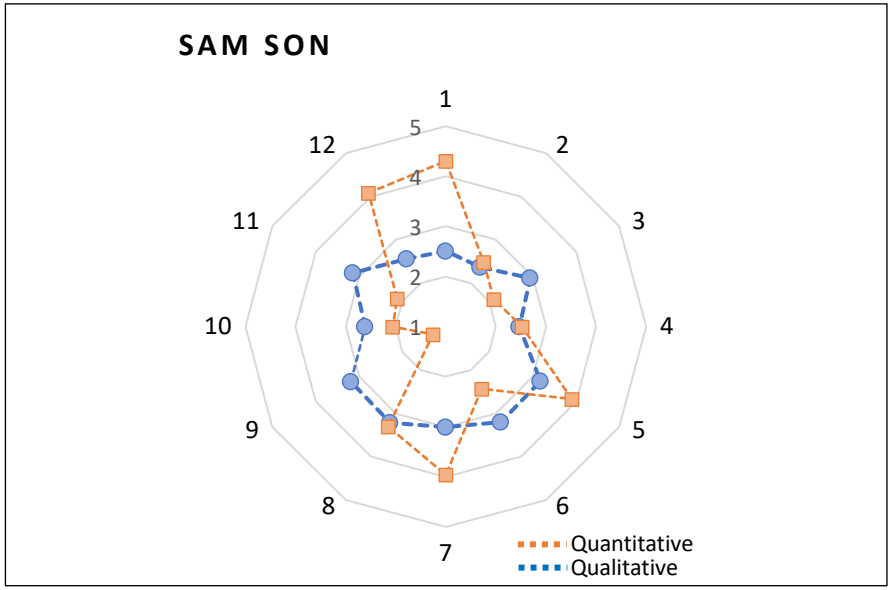


Sầm Sơn:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	4.3	5/5	3.1	2.5
2. Diverse livelihood & employment	9/10	2.6	2.5	6/6	2.7	2.3
3. Effective safeguard to human health & life	7/7	3.0	2.1	4/4	2.8	3.0
4. Collective identity & community support	5/5	2.2	2.5	4/4	2.9	2.4
5. Security & rule of law	6/8	3.2	3.9	3/3	3.3	3.2
6. Sustainable economy	6/7	2.5	2.4	5/5	2.9	3.1
7. Reduced exposure & fragility	6/6	3.6	4.0	4/4	3.0	3.0
8. Effective provision of critical services	8/8	3.0	3.3	5/5	3.1	3.2
9. Reliable mobility & communications	3/8	2.7	1.3	4/4	3.3	3.1
10. Effective leadership & management	6/7	1.9	2.1	5/5	3.2	2.6
11.Empowered stakeholders	4/4	3.5	2.1	3/3	3.1	3.1
12. Integrated development planning	6/7	3.6	4.1	4/4	2.9	2.6

Commentary

Sam Son's scores for vulnerability (1) and security (5) are well above the averages for other cities. For its qualitative scores, however, only safeguards (3) and sustainable economy (6) are, to a small degree, higher than the average while all the other metrics are either equal or below. The town's quantitative and qualitative metrics only match with regard to livelihoods (2 - low score), collective identity (4 – low score), and 8 (provision of critical services – medium high score). On contrary, the city's metrics diverge for vulnerability (1 – high quantitative), reduced exposure (7 – high quantitative), reliable mobility (9 – low quantitative), and integrated planning (12 – high quantitative). The data presented here suggests that the city is doing well in all the four dimensions to some extent. However, since the town was just promoted to urban category 3, there is still room for improvement in terms of infrastructure and mobility. The large divergences also suggest that the assessors may be underrating the town's vulnerability (1) and integrated development planning (12).

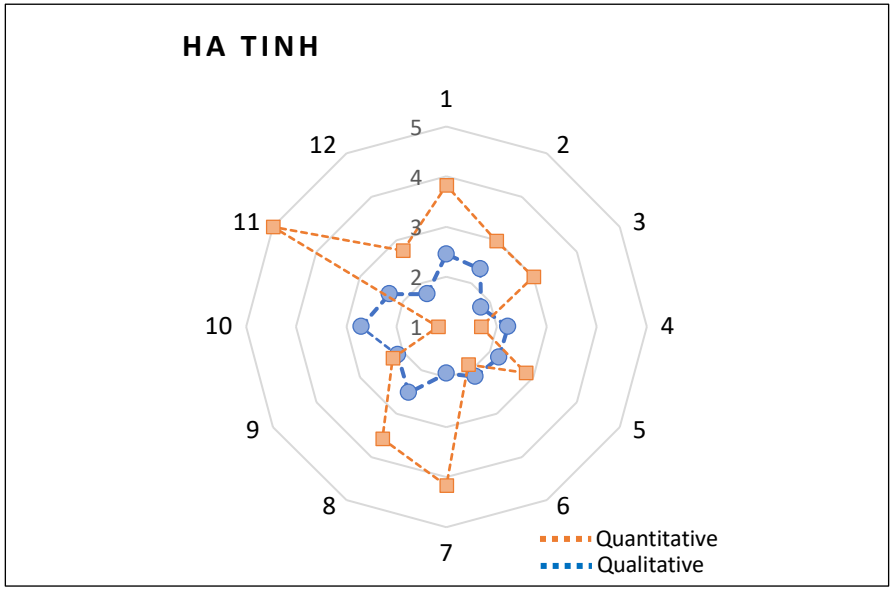


Hà Tĩnh:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.8	5/5	3.1	2.4
2. Diverse livelihood & employment	7/10	2.6	3.0	6/6	2.7	2.3
3. Effective safeguard to human health & life	6/7	3.0	3.0	4/4	2.8	1.8
4. Collective identity & community support	4/5	2.2	1.7	4/4	2.9	2.2
5. Security & rule of law	5/8	3.2	2.8	3/3	3.3	2.2
6. Sustainable economy	5/7	2.5	1.9	5/5	2.9	2.0
7. Reduced exposure & fragility	6/6	3.6	4.2	4/4	3.0	1.9
8. Effective provision of critical services	8/8	3.0	3.5	5/5	3.1	2.5
9. Reliable mobility & communications	6/8	2.7	2.2	4/4	3.3	2.1
10. Effective leadership & management	6/7	1.9	1.2	5/5	3.2	2.7
11.Empowered stakeholders	1/4	3.5	N.D.	3/3	3.1	2.3
12. Integrated development planning	7/7	3.6	2.8	4/4	2.9	1.8

Commentary

Ha Tinh's scores for diverse livelihoods and employment (2), reduced exposure (7) and provision of critical services (8) are higher than the averages for other cities. However, none of its qualitative scores are higher than the averages. The town's quantitative and qualitative metrics only match with regard to sustainable economy (6 - low score) and reliable mobility and communications (9 - low score). Its metrics diverge for all the other goals. In most cases its quantitative scores are higher than its qualitative ones, except for identity (4) and leadership (10). Large divergences can be seen at reduced exposure (7 – high quantitative) and effective leadership (10 – high qualitative). The quantitative score for empowered stakeholders (11) is an outlier in the data set due to limited data. The figures show that the city is doing better than others protecting its citizens and infrastructure, but not so well in managing community cohesion in particular, and the leadership and management in general. The large divergences also suggest that the assessors may be overrating the town's leadership capacity (10).

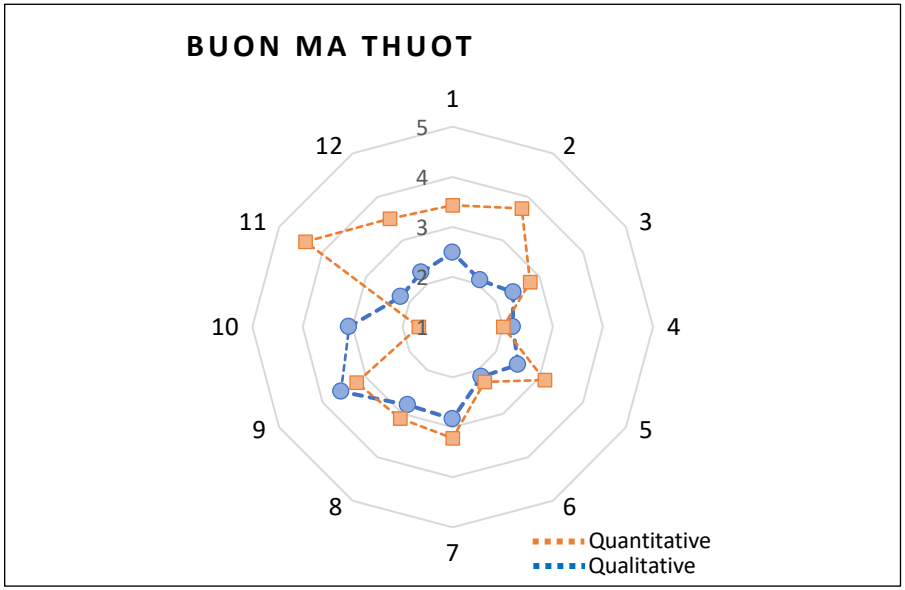


Buôn Ma Thuột:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.4	5/5	3.1	2.5
2. Diverse livelihood & employment	10/10	2.6	3.7	6/6	2.7	2.0
3. Effective safeguard to human health & life	6/7	3.0	2.8	4/4	2.8	2.4
4. Collective identity & community support	5/5	2.2	2.0	4/4	2.9	2.1
5. Security & rule of law	7/8	3.2	3.1	3/3	3.3	2.5
6. Sustainable economy	6/7	2.5	2.3	5/5	2.9	2.0
7. Reduced exposure & fragility	6/6	3.6	3.2	4/4	3.0	2.8
8. Effective provision of critical services	8/8	3.0	3.1	5/5	3.1	2.8
9. Reliable mobility & communications	7/8	2.7	3.2	4/4	3.3	3.5
10. Effective leadership & management	6/7	1.9	1.7	5/5	3.2	3.1
11.Empowered stakeholders	3/4	3.5	4.4	3/3	3.1	2.2
12. Integrated development planning	7/7	3.6	3.5	4/4	2.9	2.3

Commentary

Buon Ma Thuot's scores for diverse livelihood (2) and empowered stakeholders (11) are well above the average for other cities. However, the city's quantitative scores are generally equal or slightly lower than the average. In addition, most of its qualitative scores are significantly below the average, except for reliable mobility (9). The city's quantitative and qualitative metrics diverge for livelihoods and employment (2 – high quantitative), leadership and management (10 – low quantitative), and empowered stakeholders (11 – high quantitative. The data presented here suggests that the city is doing better in the first dimension – Health and Wellbeing, and the third– Infrastructure and Environment than in either Economy and Society (2) or Leadership and Strategy (4). The large divergences also suggest that the assessors may be underrating the city's vulnerability (1), livelihood and employment capacity (2), empowered stakeholders (11), and integrated development planning (12), while overrating the its leadership and management (10).

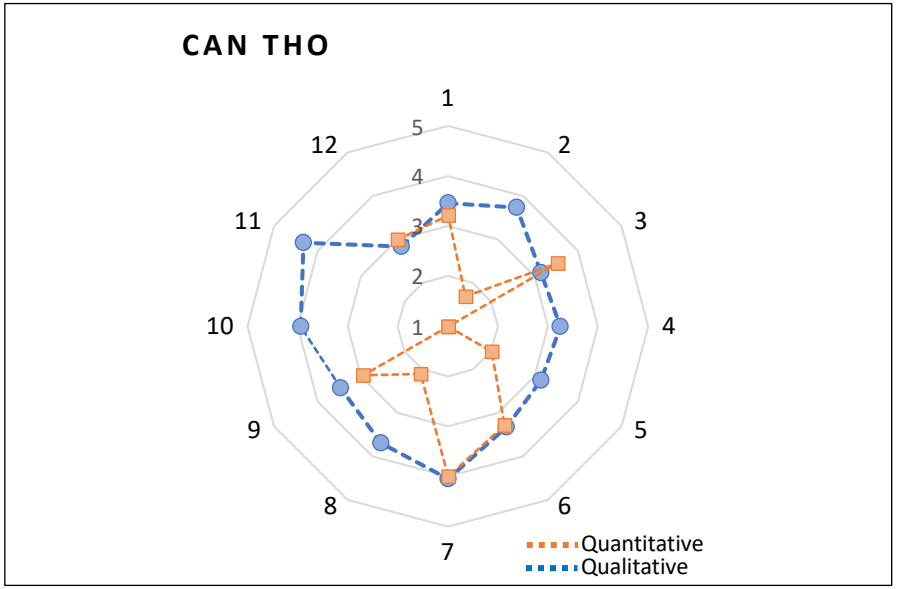


Cần Thơ:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	5/8	3.6	3.2	5/5	3.1	3.4
2. Diverse livelihood & employment	4/10	2.6	1.7	6/6	2.7	3.6
3. Effective safeguard to human health & life	3/7	3.0	3.5	4/4	2.8	3.1
4. Collective identity & community support	1/5	2.2	N.D.	4/4	2.9	3.2
5. Security & rule of law	4/8	3.2	2.0	3/3	3.3	3.1
6. Sustainable economy	4/7	2.5	3.3	5/5	2.9	3.2
7. Reduced exposure & fragility	4/6	3.6	4.0	4/4	3.0	4.0
8. Effective provision of critical services	5/8	3.0	2.1	5/5	3.1	3.7
9. Reliable mobility & communications	3/8	2.7	3.0	4/4	3.3	3.4
10. Effective leadership & management	2/7	1.9	1.0	5/5	3.2	3.9
11.Empowered stakeholders	0/4	3.5	N.D.	3/3	3.1	4.3
12. Integrated development planning	2/7	3.6	3.0	4/4	2.9	2.8

Commentary

Can Tho's score for sustainable economy (6) is well above the average for other cities. Its qualitative scores for livelihood & employment (2), reduced exposure (7) services (8), leadership (10), and empowered stakeholders (11) are also above the averages. At the same time, its quantitative scores for livelihood and employment (2), security (5), provision of critical services (8), leadership (10), and integrated planning (12) are well below averages. The city did not provide data for collective identity (4) and empowered stakeholders (11). None of the city's qualitative scores are lower than the averages, except for integrated planning (12), though it is only 0.1 point lower. The town's quantitative and qualitative metrics match with regard to minimal vulnerability (1), safeguard (3), sustainable economy (6) – all at medium scores, reduced exposure (7 – high-medium score), mobility and communications (9 - medium score), and integrated planning (12 – medium score). Its metrics diverge for livelihood (2), security (5), critical services (8), and leadership (10). In each case, the qualitative scores are higher than the quantitative ones. The scores suggest that the city is doing better than others providing safeguards, building the economy, and protecting the residents from disasters, yet not so well in livelihoods and leadership. The large divergences also suggest that the assessors may be overrating the town's leadership capacity (10) and stakeholder empowerment (11).

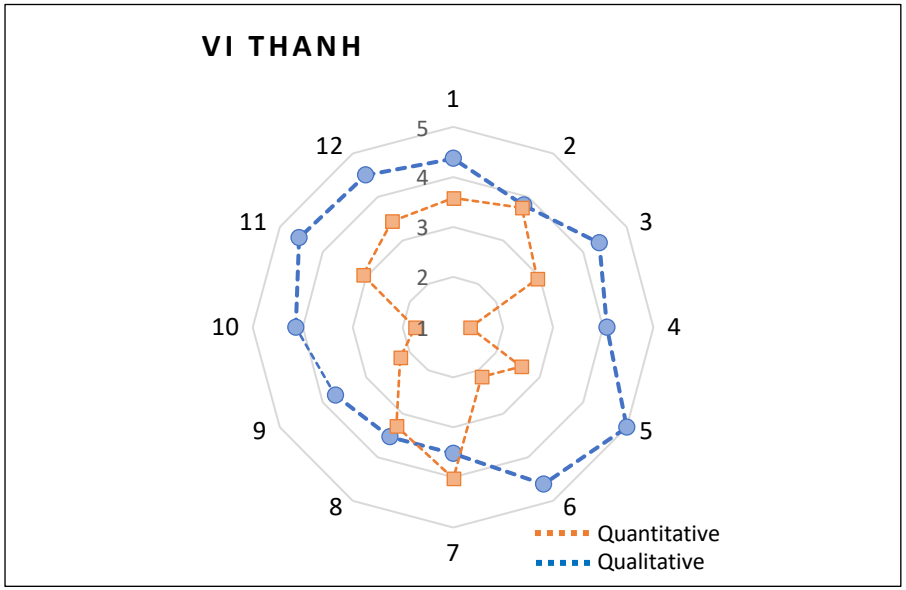


Vị Thanh:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	3.6	5/5	3.1	4.3
2. Diverse livelihood & employment	5/10	2.6	3.7	6/6	2.7	3.8
3. Effective safeguard to human health & life	4/7	3.0	2.9	4/4	2.8	4.4
4. Collective identity & community support	2/5	2.2	1.3	4/4	2.9	4.1
5. Security & rule of law	4/8	3.2	2.6	3/3	3.3	5.0
6. Sustainable economy	4/7	2.5	2.1	5/5	2.9	4.4
7. Reduced exposure & fragility	6/6	3.6	4.0	4/4	3.0	3.5
8. Effective provision of critical services	8/8	3.0	3.3	5/5	3.1	3.5
9. Reliable mobility & communications	6/8	2.7	2.2	4/4	3.3	3.7
10. Effective leadership & management	6/7	1.9	1.8	5/5	3.2	4.1
11.Empowered stakeholders	3/4	3.5	3.1	3/3	3.1	4.6
12. Integrated development planning	6/7	3.6	3.5	4/4	2.9	4.5

Commentary

Vi Thanh's scores for diverse livelihood (2), reduced exposure (7), and provision of critical services (8) are higher than the averages for other cities. It is the only city whose ***qualitative scores are higher than the averages for every goal***, with some metrics having values that are significantly higher, including vulnerability (1), livelihood (2) safeguards (3), collective identity (4), security (5), sustainable economy (6), leadership (10), empowered stakeholders (11), and integrated planning (12). At the same time, its quantitative score for collective identity (4) is well below the average, and its qualitative score of security (5) reaches to the highest level – 5 points. The town's quantitative and qualitative metrics only match for diverse livelihood (2 – medium high), critical service (8 – medium high), and to some extent the reduced exposure (7 – also medium high). The divergence can be seen at most of the other metrics, significantly at collective identity (4), security (5), sustainable economy (6), and effective leadership (10), when all the qualitative values higher than the quantitative ones. The qualitative data presented here suggests that the city is doing the best among the roll-out cities by having all of its scores higher than the average. The large divergences suggest that the assessors may be overrating the town's resilience in various aspects, especially in the dimensions of Economy and Society, and Leadership and Strategy. Unlike Son La, ***most of Vi Thanh's qualitative scores are higher than its quantitative ones***, except for reduced exposure and fragility (7).

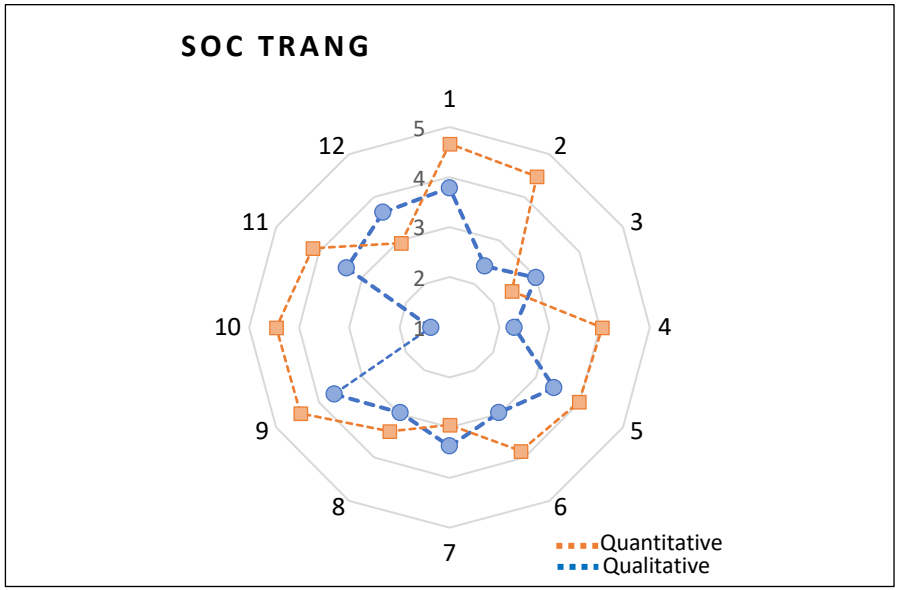


Sóc Trăng:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	8/8	3.6	3.8	5/5	3.1	4.6
2. Diverse livelihood & employment	7/10	2.6	2.4	6/6	2.7	4.3
3. Effective safeguard to human health & life	6/7	3.0	3.0	4/4	2.8	2.4
4. Collective identity & community support	4/5	2.2	2.3	4/4	2.9	4.0
5. Security & rule of law	6/8	3.2	3.4	3/3	3.3	4.0
6. Sustainable economy	4/7	2.5	3.0	5/5	2.9	3.7
7. Reduced exposure & fragility	6/6	3.6	3.4	4/4	3.0	2.9
8. Effective provision of critical services	8/8	3.0	3.0	5/5	3.1	3.4
9. Reliable mobility & communications	6/8	2.7	3.7	4/4	3.3	4.3
10. Effective leadership & management	5/7	1.9	1.4	5/5	3.2	4.5
11.Empowered stakeholders	3/4	3.5	2.8	3/3	3.1	4.2
12. Integrated development planning	7/7	3.6	3.7	4/4	2.9	2.9

Commentary

Soc Trang's scores for sustainable economy (6) reliable mobility (9) are well above the averages for other cities. Besides, most of its qualitative scores (8/12) are significantly higher than the averages. Its quantitative scores for effective leadership (10) and empowered stakeholders (11) are well below the averages, whereas only the qualitative score for safeguards (3) is slightly lower than the average. The town's quantitative and qualitative metrics are fairly well matched with regard to safeguards to health (3 – medium score), security (5), reduced exposure (7), and provision of critical services (8). On the contrary, the city's metrics diverge for diverse livelihood (2), collective identity (4), and effective leadership (10), – all with high qualitative scores. The larges divergences presented here suggests and underlying problem in Soc Trang regarding effective leadership and management (10), diverse livelihood and employment (2) and collective identity and community support (4).

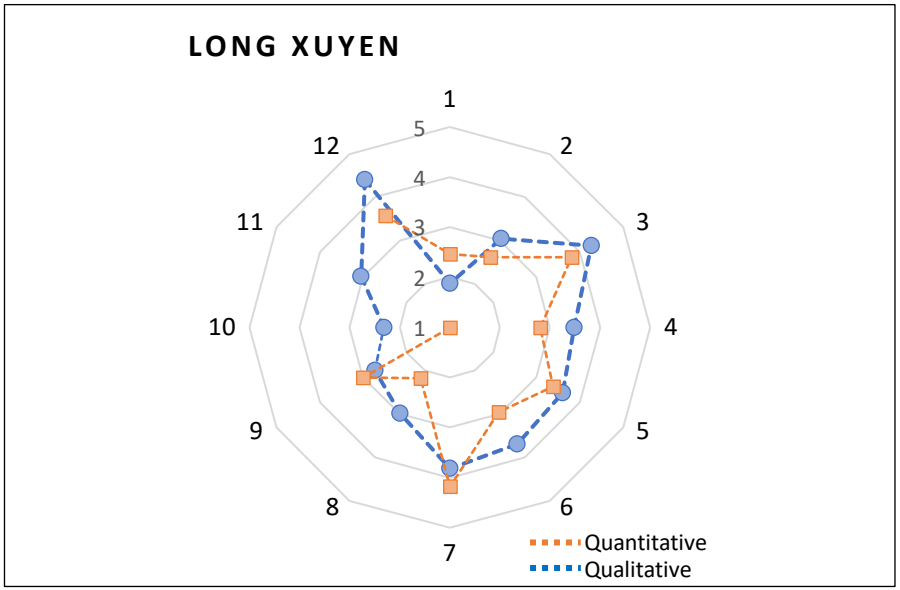


Long Xuyên:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	7/8	3.6	2.5	5/5	3.1	1.9
2. Diverse livelihood & employment	8/10	2.6	2.6	6/6	2.7	3.0
3. Effective safeguard to human health & life	6/7	3.0	3.8	4/4	2.8	4.3
4. Collective identity & community support	5/5	2.2	2.8	4/4	2.9	3.5
5. Security & rule of law	5/8	3.2	3.4	3/3	3.3	3.6
6. Sustainable economy	4/7	2.5	2.9	5/5	2.9	3.5
7. Reduced exposure & fragility	6/6	3.6	4.2	4/4	3.0	3.8
8. Effective provision of critical services	6/8	3.0	2.2	5/5	3.1	3.0
9. Reliable mobility & communications	4/8	2.7	3.0	4/4	3.3	2.7
10. Effective leadership & management	5/7	1.9	1.0	5/5	3.2	2.3
11.Empowered stakeholders	0/4	3.5	N.D.	3/3	3.1	3.0
12. Integrated development planning	5/7	3.6	3.6	4/4	2.9	4.4

Commentary

Long Xuyen's scores for safeguards (3) and collective identity (4) are well above the averages for other cities. Its qualitative scores for safeguards (3), collective identity (4), sustainable economy (6), reduced exposure (7) and integrated development planning (12) are also above average. At the same time, its quantitative scores for vulnerability (1), provision of critical services (8), and effective leadership (10) are well below averages, and as are its qualitative scores for vulnerability (1), reliable mobility and communication (9), and effective leadership (10). The town's quantitative and qualitative metrics match in most cases, except for leadership (10 - high qualitative), and integrated planning (12 – high qualitative). Similar to Nam Dinh, Ha Tinh, can Can Tho, the city does not have quantitative data for empowered stakeholders (11). Therefore, the comparison between quantitative and qualitative scores of this metric is not possible. The data presented here suggests that the city is doing better than others protecting its citizens, preserving natural assets and infrastructure, and to some extent, sustaining its economy. But it needs much more improvements with regard to indicators related to leadership and strategy, dimension 4.

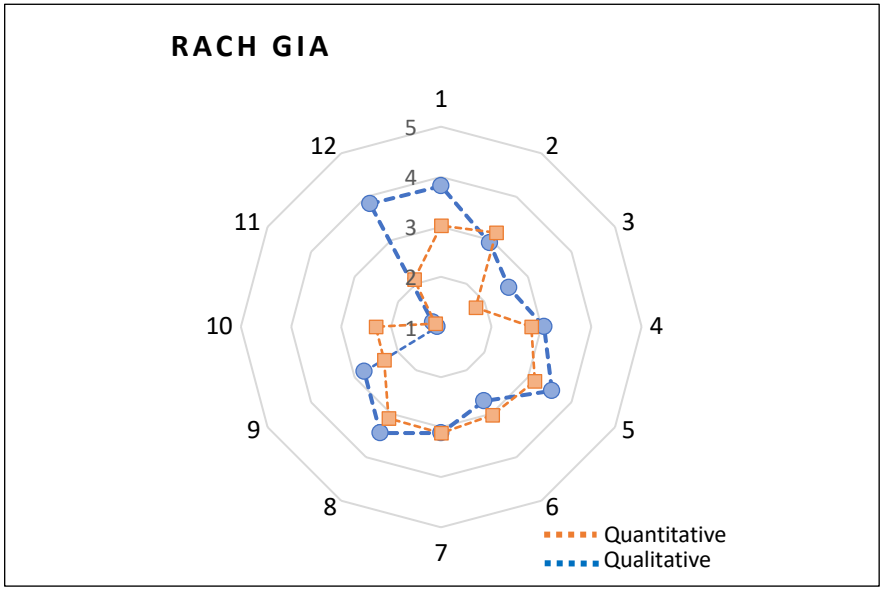


Rạch Giá:

	Quantitative			Qualitative		
	Data	Avg.	Score	Data	Avg.	Score
1. Minimal human vulnerability	6/8	3.6	3.8	5/5	3.1	3.0
2. Diverse livelihood & employment	8/10	2.6	2.9	6/6	2.7	3.0
3. Effective safeguard to human health & life	5/7	3.0	2.6	4/4	2.8	1.8
4. Collective identity & community support	3/5	2.2	3.0	4/4	2.9	2.7
5. Security & rule of law	5/8	3.2	3.5	3/3	3.3	3.2
6. Sustainable economy	6/7	2.5	2.7	5/5	2.9	2.9
7. Reduced exposure & fragility	6/6	3.6	3.1	4/4	3.0	3.1
8. Effective provision of critical services	8/8	3.0	3.4	5/5	3.1	3.1
9. Reliable mobility & communications	5/8	2.7	2.8	4/4	3.3	2.3
10. Effective leadership & management	5/7	1.9	1.1	5/5	3.2	2.3
11.Empowered stakeholders	1/4	3.5	1.2	3/3	3.1	1.1
12. Integrated development planning	6/7	3.6	3.8	4/4	2.9	2.1

Commentary

Rach Gia's score for collective identity (4) is well above the average for other cities. It's score for provision of critical services is also higher than the average. Though not significantly so. None of its qualitative scores, however, are well above the averages. Meanwhile, its quantitative scores for safeguards (3), effective leadership (10), and empowered stakeholders (11) are well below the averages. Among these, the score for empowered stakeholders is only one third of the corresponding average score. The town's quantitative and qualitative metrics roughly match in most cases, except for integrated planning (12 – high quantitative), and to a lesser degree, vulnerability (1) and safeguards (3 – both having medium to high quantitative scores). The city has low scores, both quantitatively and qualitatively, for empowered stakeholders (11). The data presented here suggests that the city is doing better than others minimizing the vulnerability to its citizens, and to some extent doing well in integrating its planning, but not so well in providing effective leadership (evidence-based decision making, multi-stakeholder consultation, etc.) and empowering its stakeholders (access to information, education for all, etc.).



Appendix 2: Quantitative Metrics

Dimension	Goal	Indicator	Variable
1. Health and Well-being[3]	1. Minimal human vulnerability	1.1 Safe and affordable housing	1.1.1 Percentage of households having private houses in the city that are granted land use right certificates (a private house is that built on a land plot and owned by an individual household and is not apartment nor rented)
			1.1.2 Average housing floor area per capita in inner-city area
			1.1.3 Percent HHs living in permanent or semi-permanent house
		1.2 Safe, robust and inclusive access to energy for all	1.2.2 Number of power cuts per year per 10,000 customers
		1.3 Safe, robust and inclusive access to water for all	1.3.1 Percentage of inner-city population that regularly use hygienic water
		1.4 Effective sanitary	1.4.2 Percentage of households in inner-city area that have toilets with septic system
		1.5 Sufficient and affordable food supplies for all	1.5.1 Percentage of city's children under 5 that suffer malnutrition
			1.5.2 Percentage of monthly per capita expenditures of the poorest urban income quintile spent on food
	2. Diverse livelihood and employment	2.1 Robust and inclusive labor policies and standards and social security provision	2.1.1 Average monthly income of the city's laborers
			2.1.2 Urban unemployment rate
			2.1.3 Urban poverty rate
			2.1.4 Percentage of total yearly city expenditure that is spent on social subsidies
		2.2 Provision of appropriate skills and training for all	2.2.1 PCI score for "ratio of vocational training school graduates to untrained laborers" (2016)
		2.3 Robust and innovative business environment	2.3.1 Number of all types of businesses granted licenses to operate in a recent year per 10,000 city population
			2.3.2 Percentage of legally registered businesses that have survived after one year since establishment
			2.3.3 Percentage of legally registered businesses that are owned by women or ethnic minorities
		2.4 Effective mechanisms for access to finance for businesses and households	2.4.1 Average loan size for Vietnam Bank of Social Policies Clients (2017)

[3] These metrics are translated from Vietnamese originals.

Dimension	Goal	Indicator	Variable
		2.6 Emergency support to households post-disaster	2.6.1 Does the city have a mechanism in place to provide finance and/or non-finance support that people can access following a disaster?
			2.6.2 Does the city have a mechanism in place to provide finance and/or non-finance support that businesses can access following a disaster?
	3. Effective safeguard to human life and health	3.1 Robust public health system	3.1.1 Percentage of children under 1 year that have received full vaccination (according to the extended national vaccination program) in the most recent year
			3.1.2 Average life expectation of the city citizens
		3.2 Adequate and inclusive access to healthcare	3.2.1 Number of medical doctors for every 10,000 city inhabitants
		3.3 Adequate resources for emergency health services	3.3.1 Number of hospital beds for every 10,000 city inhabitants
			3.3.2 Percentage of public healthcare facilities that have plans to respond to city wide medical emergencies such as epidemics or natural disasters.
		3.4 Effective emergency response service	3.4.1 Number of ambulances for every 10,000 city inhabitants
			3.4.3 Number of professional firemen for every 10,000 city inhabitants
2. Economy and Society	4. Collective identity and community support	4.1 Community mutual support	4.1.1 Number of houses provided to the poor (nhà tình nghĩa) per number of poor, single-parent and other policy-favored households
			4.1.2 Percentage of yearly city budget expenditure that is spent for supporting families in hardship (according to Government criteria)
		4.2 Community social connectivity	4.2.2 Percentage of women members of current city People's Council
			4.2.3 Percentage of ethnic minorities among members of current city People's Council
		4.3 Distinctive cultural identity	4.3.1 Number of cultural facilities such as theatres, cinemas, museums, libraries, cultural palaces, heritage sites, and monuments at the ward and commune level and up for every 10,000 city inhabitants
		4.4 Active community participation	4.4.1 Number of clubs, associations, and civil society organizations operating in the city for every 10,000 city inhabitants
	5. Security and rule of law	5.1 Effective deterrence to crime	5.1.1 Number of yearly crime cases for every 10,000 city inhabitants in the most recent year
			5.1.2 Average yearly number of convicted criminals for every 10,000 city inhabitants in the most recent year

Dimension	Goal	Indicator	Variable
			5.1.3 Percentage of streets and lanes in residential areas that have sufficient lighting in the most recent year
		5.2 Proactive corruption prevention	5.2.1 Score for "Informal Charges" from PCI 2016
			5.2.2 Score for "Transparency" from PCI 2016
		5.4 Accessible civil and criminal systems of justice	5.4.1 Percentage of people in pre-trial detention out of total prison population
			5.4.2 Score for "Legal Institutions" from PCI (2016)
			5.4.3 Percentage of people participating in court cases that have free legal support (people refers to both parties of a court case, i.e. victims and defendants)
	6. Sustainable economy	6.1 Well-managed public financing	6.1.1 Budget deficit ratio for city in recent year
			6.1.2 Percentage of city yearly budget expenditure that is allocated to police, fire, ambulance units in the most recent year
		6.3 Diverse local economy	6.3.1 Average yearly growth of the city's businesses in the past 5 years
			6.3.2b Increase or decrease in the number of businesses in the last year (2016) per 10,000 population
		6.4 Attractive business environment	6.4.2 Percentage of people within working age that have university degrees
			6.4.3 Overall provincial score from PCI for 2016
		6.5 Active integration into regional and global economies	6.5.1 Value of city exports to other places, both domestic and international, as a percentage of city GDP
3.Infrastructure and Environment	7. Reduced physical exposure	7.1 Comprehensive assessment of threats and risks in the whole city	7.1.1 Percentage of city wards and communes that have carried out the assessment of natural disaster risks
			7.1.2 How many years ago was the latest city strategic plan to respond to climate change developed?
		7.2 Well-conformed standards and regulations	7.2.2 Percentage of buildings/facilities with construction permits provided by an authorized agency
		7.3 Effectively managed protective ecosystems	7.3.1 Percentage of green space, such as parks, flower gardens, sports fields, agriculture and forestry areas, and natural forest, out of total city area
		7.4 Safeguards for critical infrastructure	7.4.1 How many years ago on average were the city's protection infrastructure (dykes, pumps etc.) last checked for damage?
			7.4.2 Number of deaths caused by the natural disasters in the city in the past 5 years
	8. Continuity of critical services	8.1 Effectively managed ecosystems	8.1.1 Number of years since last assessment of the city's ecosystem assets and services.

Dimension	Goal	Indicator	Variable
		8.2 Flexible infrastructure	8.2.1 Percentage of city budget used for upgrading infrastructure in the last year.
			8.2.2 Number of types of drinking water sources currently used within the city, including bottled water, deep wells, shallow wells, rivers, reservoirs, rainwater.
			8.2.3 Percentage of domestic solid waste generated in the city that is treated hygienically in the most recent year
		8.3 Redundant capacity of systems	8.3.1 Average yearly domestic consumption of electricity per capita in the most recent year
			8.3.2 Total supply of hygienic water compared to total water need of the city in the most recent year
			8.3.3 Actual daily water consumption per capita of the city in the most recent year
			8.3.4 Percentage of the city's waste water that is treated in the most recent year
		8.4 Sustaining infrastructure system and service continuity	8.4.1 Hours of electrical interruptions in the city in the most recent year
		8.5 Adequate continuity of critical infrastructure and services of the city for emergencies	8.5.1 Percentage of the city's hospitals (both public and private) that have back-up electricity generators
			8.5.2 Percentage of the city's hospitals that have back-up sources of water for use in case of emergency.
	9. Reliable mobility and communications	9.1 Multi-modal and affordable transport networks	9.1.1a Average maximum speed of driving motorbikes from the city center to the suburbs
			9.1.1b Percentage of roads (including internal roads, inter-provincial roads and highways) in the city that have concrete separators (1 traffic lane and above)
			9.1.2a Number of urban bus routes within the province in 2016
			9.1.2b Length of urban bus routes within the province in 2016
		9.2 Robust maintenance and operation of transport systems	9.2.1 Number of deaths caused by road accidents per 10,000 people in the city in the most recent year
			9.2.3 Number of two-lane roads or larger out of the city to the adjacent areas
		9.3 Reliable communication technology	9.3.1 Number of telephone subscribers (landlines and cell phones) per 10,000 inhabitants
			9.3.2 Of the following communications networks, how many are used by responsible government authorities to alert people in case of

Dimension	Goal	Indicator	Variable
			emergency: online news, official website, SMS messaging, radio channels, TV channels, loudspeakers.
		9.4 Safe technological networks	9.4.2 Which of the following basic infrastructure systems are protected from cyber-attack by computer security software or data back-up systems: electricity supply, water supply, traffic signals.
4. Leadership and Strategy	10. Effective leadership and management	10.1 Robust decision making by municipal government	10.1.1 Number of programs/projects (in infrastructure development, environmental protection, healthcare, community development, etc.) jointly implemented by the city and international organizations in the most recent year
			10.1.2 Percentage of city level offices that update news and provide contact information through internet websites
		10.2 Effective coordination with the city's agencies	10.2.1 Number of climate change related projects in the city that were jointly implemented by at least 2 partners in the government system in the most recent year
		10.3 Constructive collaboration between all actors	10.3.1 Percentage of major plan/policy decisions related to natural disaster response (storms, floods, droughts, earthquakes, etc.) made within the last year that included *interagency* consultations
		10.4 Comprehensive hazard monitoring and risk	10.4.1 For the city's primary natural hazard, how many of the following actions has the city or province taken: scientific study, community consultations, real-time monitoring, disaster preparedness training for people in vulnerable areas, use of media to alert citizens in case of emergency.
			10.4.2 Number of disaster risk assessments of the city conducted by related stakeholders in the last two years
		10.5 Comprehensive assessment of emergency situations	10.5.1 Percentage of government staff that participated in emergency response practice training in the last 5 years
			10.5.2 Number of times the cross-sectoral emergency response strategy of the city was reviewed in the past 5 years
			10.5.3 Number of emergency drills organized by many emergency response forces in the city jointly in the most recent year
	11. Empowered stakeholders	11.1 Inclusive education	11.1.1 High school completion rate for girls
			11.1.2 Adult literacy rate
			11.1.3 Percent population with university degree
		11.2 Inclusive awareness and preparedness in the communities	11.2.1 Percentage of wards and communes that have plans to respond to natural disasters

Dimension	Goal	Indicator	Variable
			11.2.3 Percentage of city population who have been safely evacuated due to natural disaster within the past 5 years
		11.3 Effective mechanism for coordination between local government and citizens	11.3.1b Number of city-level disaster related plans that have a budget line for ward and commune level disaster preparedness, response or recovery work in the most recent year
	12. Integrated development planning	12.1 Comprehensive city monitoring and data management	12.1.1 For how many years in the future is the city's population forecast made?
			12.1.2 Percentage of the city's housing units that are in high-risk areas (related to erosion, flooding, and environment pollution, etc.)
			12.1.3 Percentage of current planning policies and land use plans of the city that have been developed with reference to a relevant disaster risk
		12.2 Planning process with consultation	12.2.1 Percentage of land use and detailed plans of the city that have been developed with formal consultations with public service providers including transport ones
			12.2.2 Percentage of urban development project plans that include consultations with people that are affected by the plans
		12.3 Appropriateness of zoning and land use plans	12.3.2 Total green area in the inner-city area (excluding agriculture areas) per 10,000 people
			12.3.3 How many years ago were the city's urban development strategies and plans updated?
		12.4 Transparent plan approval process	12.4.1 Percentage of construction built in the past 5 years that have construction permits
			12.4.2 Percentage of area development plans within the city that have been submitted and/or approved within the past 5 years that were posted on city or province websites

Appendix 3: Qualitative Scenarios

I. HEALTH AND WELLBEING[4]

Goal 1. Minimal human vulnerability (Question 1.1 – 1.5)

Question 1.1. How do you assess the city's current housing situation?

10	9	8	7	6	5	4	3	2	1

Assessment criteria.

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city's supply of high quality and affordable housing is able to meet demand of people of different walks of life. • All residents and organizations have security of tenure and property rights for what they legally own. • The poor and the low-income people have easy and quick access to city's financial funds to buy or upgrade their homes. • Citizens and agencies get consulted on housing design and construction standards by an authorized agency. • The urban planning and the issuance of housing construction permit works effectively in the way that only few people have to live in disaster-prone areas. • The city has an emergency plan for emergency shelter and temporary housing that can accommodate a big number of people in case of disasters.	• The city is not able to supply high quality and affordable housing for most citizens, especially social housing for the poor and the low income. • Very few citizens and agencies have secured their tenure and property ownership. • The poor and the low income have no access to the city's financial sources for buying or upgrading their homes. • Citizens and agencies are not consulted on housing design and construction standards. • Urban planning and housing development policy is not available, or not effectively implemented, leading to a rampant violation of urban planning and construction discipline, and many people have to live in disaster-prone areas. • The city does not have an emergency plan for emergency shelter and temporary housing.

[4] These scenarios are translated from Vietnamese originals.

Question 1.2. How do you assess the city's electricity supply to the households?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• All household are connected to the electricity grid. • The electricity cost is affordable to most people; the city has a mechanism to support a part of electricity cost for the poor and the low-income people. • Electrical interruptions or power cuts rarely happen. • The city has a contingency plan that identifies alternative fuels that can be supplied to households for lighting and cooking when electricity is off in emergency cases. This contingency plan is regularly reviewed and updated. • The city has a mechanism to encourage diversified alternative fuel supplies (wind, sun power, biogas etc.) to ensure power security.	• Most household are not connected to the electricity grid. • The electricity cost is not affordable to most people; the city has no mechanism to support a part of electricity cost for the poor and the low-income people. • Power is often interrupted or cut off for long periods. • The city has no contingency plan on fuels that can be supplied to households when electricity is off in emergency cases. • The city has no mechanism to encourage diversified alternative fuel supplies (wind, sun power, biogas etc.) to ensure power security.

Question 1.3. How do you assess the city's clean water supply to the household?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• All households and agencies are supplied with clean water. • The city monitors and inspects on a regular basis the conformance of water standards and service quality by water suppliers. • Water cuts rarely happens. • The city has a contingency plan on alternative clean water supply during emergencies for households, including the poor. This plan is regularly updated. • Water supply capacity can ensure clean water is supplied sufficiently and continuously even in case of rapid population growth or disasters.	• Most households and agencies are not connected to safe and reliable water sources. • The city has no appropriate mechanism to supervise quality of domestic water and water suppliers. • Water cuts happen often and last for long periods. • The city has no contingency plan on water supply during emergencies. • Water supply capacity cannot ensure clean water is supplied sufficiently and continuously in case of rapid population growth or disasters.

Question 1.4. How do you assess the city's sanitation (in relation to sewerage and latrines)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• All households in inner-city areas are connected with public sewers. • There are no places flooded as a consequence of heavy rains. • The province/city has a rapid response mechanism for water drainage to deal with heavy rains. • All households living in urban areas have septic tanks; and all households living in rural areas have latrines that meet MoH standards. • Solid waste is properly collected. There are no places where waste is accumulated. • Sanitation propaganda has been carried out and people have high environmental sanitation awareness. • The province/city has a contingency sanitation program to deal with natural disasters or major sanitation disruptions (alternative water drainage options, sterilization etc.)	• Most households in inner-city areas are not connected with public sewers. • There are many places flooded as a consequence of heavy rains. • The province/city does not have a rapid response mechanism for water drainage to deal with heavy rains. • Most households living in both urban and rural areas don't have latrines that meet MoH standards. • Solid waste is not properly collected. There are many places where waste is accumulated. • No sanitation propaganda has been carried out and people lack environmental sanitation awareness. • The province/city has no contingency sanitation program to deal with natural disasters or major sanitation disruptions.

Question 1.5. How do you assess the city's essential food supply in case of natural disasters and impact of climate change (e.g. storms, flood, drought, salinization)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• All citizens have access to safe food at affordable price. • There is no significant fluctuation in price of essential food stuffs. • There is a network of diversified markets, supermarkets, food stores that are located at reasonable distances to living quarters. • The province/city applies measures for monitoring, inspection and strict punishment for the violations of food hygiene and safety. • The province/city has a contingency plan to ensure essential food is supplied to people during emergencies.	• Most people have difficulty in accessing safe food at affordable price. • There are significant fluctuations in price of essential food stuffs, which recently became expensive. • There is a lack of markets, supermarkets and food stores in many city's areas. • The province/city has no measures to ensure food hygiene and safety. • The province/city has no contingency plan to ensure essential food is supplied to people during emergencies.

Goal 2. Diverse livelihood and employment (Question 2.1 – 2.6)

Question 2.1. How do you assess the city's policies in labor and employment?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city disseminates sufficient information on Labor Law, social and health insurance and regulations on anti-discrimination to laborer's. • The city has a mechanism to receive, process and feedback to complaints of laborer's. • The city has vocational training programs which are free or at low costs for vulnerable populations (women, ethnic minorities etc.) • The city has a program to encourage businesses to use more laborers from vulnerable groups (reduced tax, loans at favorable interest rates, support in selling production etc.) • The city regularly organizes job fairs and has established a system of job introducing centers in all districts.	• The city does not provide information on laws and regulations related to labor and employment to people. • The city has no mechanism to receive, process and feedback to complaints of laborer's. • The city has no vocational training programs that favor the vulnerable populations. • The city has no program to encourage businesses to use more laborers from vulnerable groups. • The city has no mechanism on regular job fairs and has no system of job networking centers in all districts.

Question 2.2. How do you assess the city's training measures for matching laborer's skills to the current and emerging employment marketplace?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has training program to match laborer's skills to the employment marketplace. • The city has many capable training facilities (both state and private owned) with diversified training programs that meet the need of the labor market. • The city has a program in place that searches job opportunities and connects laborers with high-wage employers and high-demand professions through websites, job fairs and mass media. • The city has a mechanism to encourage and take control in engaging employers in signing labor contract with their employees and pay social and health insurance for them.	• The city has no training program to provide skills to the laborer's. • The city has few training facilities, training programs do not meet the need of the labor market. • The province/city has no program in place to identify job opportunities and connect laborers with the employers. • The province/city has no policy in place to strengthen job security for the workforce.

Question 2.3. How do you assess the city's measures for business development and innovation?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has initiatives in place to support businesses and has simplified administrative procedures for business startups. • Tax and custom procedures have been simplified with on-line declaration; tax and custom staffs have appropriate attitude in dealing with businesses. • The province/city has in place websites, leaflets, radio, hotlines, reception offices where information on administrative procedures for setting up a business, tax payment/reimbursement, local government favorable programs/policies toward businesses is clearly posted and explained. • The province/city has concrete programs in place to support (for free or at low cost) businesses, especially those owned by women and/or ethnic minorities, in seeking market, collaborating, expanding business, building capacity/quality of workforce etc. • The province/city has been proactive in organizing regular dialogues with businesses, workshops to call for investments in the city etc.	• The city has no initiatives in place to support businesses. Administrative procedures are too complicated for business startups. • Tax and custom procedures are very complicated and time consuming; tax and custom staffs have much inappropriate attitude in dealing with businesses • The province/city has no effective system in place to convey information (administrative procedures, tax and favorable policies of the city government) to businesses and concerned parties. • Businesses, especially those owned by women and/or ethnic minorities, have no support from the province/city. • The province/city has not been proactive in having dialogues with businesses and calling for investments.

Question 2.4. How do you assess the city's mechanism to support businesses in responding to natural disasters and climate change?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has a program in place to support businesses (in providing long-term loans at low interest, reducing land use and business taxes etc.) that use lots of laborers of vulnerable populations and those having business plans that include business alternatives to respond to natural disasters and climate change. • The province/city has a program in place to encourage local businesses to collaborate, support each other and establish a value chain of local products in order to mitigate risks caused by natural disasters, climate change and market downturns. • The province/city has a coordination mechanism in place with clear responsibilities assigned to businesses and government agencies (Police, Fire Department, Steering Committee for Natural Disasters and Rescue, hospitals etc.) to ensure the maximum mitigation of risks caused by natural disasters.	• The province/city has no program in place to support businesses that use lots of laborers of vulnerable populations and those having business plans that include business alternatives to respond to natural disasters and climate change. • The province/city has no program in place to encourage local businesses to collaborate, support each other and establish a value chain of local products in order to mitigate risks caused by natural disasters and climate change. • The province/city has no mechanism in place to coordinate amongst businesses and related parties to respond to the risks caused by natural disasters and climate change.

Question 2.5. How do you assess the city's ability to provide emergency support to businesses, especially SMEs, cooperatives and business households/individuals affected by the natural disasters?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has Contingency Fund and Disaster Impact Mitigation Fund which have simple and transparent procedures as well as motivated staffs that all affected businesses in the city can access in order to recover their operation. • The province/city has a program in place to provide support (in giving long term loans at low interest rate, reducing land use tax or business tax etc.) to businesses that use lots of laborers of vulnerable populations, and those having business plans that include business alternatives to respond to natural disasters and climate change. • The city actively encourages commercial banks to provide favorable loans to businesses affected by the natural disasters or market shocks if they need capital to recover their operation.	• The city has no Contingency Fund and Disaster Impact Mitigation Fund, or businesses affected by natural disasters are not able to benefit from these funds to recover their operation due to complicated, in transparent and time-consuming procedures and a lack of proper guidance by staff in charge. • The province/city has no program in place to provide support to businesses that use lots of laborers of vulnerable populations, or those having business plans that include business alternatives to respond to natural disasters and climate change. • The city does not support businesses affected by natural disasters to access credit agencies for loans to speed up their recovery.

Question 2.6. How do you assess the city's ability to provide emergency support to households affected by the natural disaster?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has an effective mechanism in place to provide emergency support to affected households which includes financial assistance (cash, favorable credit) and none-financial one (technical guidance for production) for livelihood and re-production. • The city attracts and coordinates effectively with social organizations, NGOs and businesses to implement emergency assistance programs to support affected households, especially the poor, the disabled and lonely, those living in remote areas and those eligible for benefiting from social policies.	• The city has no mechanism in place or not implements it effectively to provide emergency support to affected households which includes financial assistance (cash, favorable credit) and none-financial one (technical guidance for production) for livelihood and re-production. • The city does not coordinate effectively with social organizations, NGOs and businesses to implement emergency assistance programs to support affected households, especially the poor, the disabled and lonely, those living in remote areas and those eligible for benefiting from social policies.

Goal 3. Effective safeguard to human health and life (Question 3.1 – 3.4)

Question 3.1. How do you assess the city's preventive health programs?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has a robust finance and allocates sufficient budget and other resources for preventive health programs. • The province/city has a public health monitoring program in place and implements activities to provide specific support to vulnerable groups of population. • Public health facilities, hotels, private restaurants are routinely inspected by authorities and the results are posted on local government websites for public viewing. • The province/city has programs in place for public health awareness building and education which include safe sex and reproductive health. • Health information and warnings are communicated to ethnic minorities and disabled people by appropriate methods.	• The city depends on the province/Central Government's subsidy and has almost no resources for preventive health programs. • The province/city has no public health monitoring program in place or implements few activities to monitor health risks and to scan diseases to control their spread and vaccination. • Vulnerable groups of population are excluded from routine health monitoring and from vaccination programs. • The city does not carry out routine inspection at public and private facilities which receive lots of people. • The city has no strategy in place to build public health awareness and education programs. • The city has no or little budget for public health awareness building and education among ethnic minorities and the disabled.

Question 3.2. How do you assess the access of the city's citizens to health service?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has health service that is accessible, affordable and transparent; all people can benefit from health insurance policy. • The city has built a network of public and private health facilities across the city, with qualified and motivated health personnel. • The city has a mechanism in place to ensure the health system can respond to emergencies and help mitigate negative impact to people's health. • The city has sufficient facilities and human resource for treating non-communicable diseases (cancer, cardiovascular issues, respiratory issues, diabetes, kidney problems etc.) at price affordable for most its citizens. • The city has an emergency plan in place for supporting people with mental illness post-shock. •	• The city has no mechanism in place to ensure that health service is affordable and transparent; only few people can benefit from health insurance policy. • The city lacks public health facilities while private health service has not been supported to develop; there is a lack of health personnel while current health staffs are not motivated. • The city does not have a mechanism in place to mobilize additional resources in case of emergency that causes increased numbers of patients. • The city lacks facilities and human resource for treating non-communicable diseases (cancer, cardiovascular issues, respiratory issues, diabetes, kidney problems etc.); health service is too expensive for most the city's citizens. • The city lacks preparedness for supporting people with mental illness post-shock.

Question 3.3. How do you assess the city's medical resources to respond to emergencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has an emergency facility namely "115" that has both professional capacity (sufficient and qualified health staff) and technical capacity (medical facilities and equipment) and has a plan in place to respond to the emergencies. • The city has built a network of "115" emergency medical stations across the city which are well equipped and located at appropriate distances to be able to reach the patients in a shortest time. • The city has a mechanism in place to mobilize the participation of public and private health facilities in responding to emergencies. • The city has a budget line and an effective emergency plan in place, which includes a plan to coordinate medical resources and has well-assigned responsibilities for dealing with disasters. • The province/city organizes periodic practice on responding to disasters at both individual medical facility (at least once a year) and at the city level (at least once in 3 years).	• The city's emergency facility "115" lacks professional capacity and also medical facilities including ambulances; the city has no plan in place to respond to the emergencies. • The city lacks "115" emergency medical stations while that available are not located at appropriate distances, making it difficult and time consuming to reach the patients. • The city has no mechanism in place to mobilize the participation of public and private health facilities in responding to emergencies. • The city lacks both budget line and an emergency to deal with emergencies. Roles and responsibilities are not well-assigned for such circumstances. • The city not, or rarely, organizes practicing on responding to the disasters, at both medical facility and city levels.

Question 3.4. How do you assess the effectiveness of the city's emergency response services (ambulance, fire, police etc.)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has a robust call-out system to effectively receive and process emergency calls. • Rescue and medical staff, firemen and policemen are well trained, assigned clear responsibilities and well equipped to be able to deal with surges in number of incidents (caused by natural disasters, terrorism etc.). • The city can quickly mobilize the army, NGOs, trained volunteers to participate in rescuing during emergencies. • The city has undertaken and updated a detailed inventory of the full set of relief assets (both public and private owned) that can be mobilized for dealing with the emergencies. • Training and coaching on searching and rescuing is implemented at least once a year.	• The city's call-out system to receive and process emergency calls is almost out of work. • Rescue and medical staff, firemen and policemen are not trained and equipped to be ready for dealing with big shocks (natural disasters, terrorism etc.). • The city has no ability to mobilize resources in the region and from the central government to respond to the shocks. • Inventory of relief assets that can be mobilized for dealing with the emergencies is not available or is neither detailed nor updated. • Training and coaching on searching and rescuing is not of the province/city's concern.

II. ECONOMY AND SOCIETY

Goal 4. Collective identity and community support (Question 4.1-4.4)

Question 4.1. How do you assess the mutual support among people and communities in the city?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• People and communities in the city have a strong community pride and tradition of mutual support. There is no discrimination among people that are different in ethnicity, religion, place of origin and income. • Neighborhoods have initiatives of protecting and supporting each other in raising children, livelihood, dealing with and overcoming difficulties such as bad harvest, illness, floods etc. • Communities have high awareness in supporting disadvantaged people (such as lonely elderly, disabled, street children, unregistered migrants etc.), especially during shocks or crisis (floods, epidemics, strong colds etc.) • Ceremonies honoring people who make outstanding contribution to community development and solidarity are regularly organized across communities.	• People and communities in the city do not support each other. There is a discrimination among people of different ethnicity, religion, place of origin and income. • Neighborhoods have no mechanism of protecting and supporting each other in daily life and in business, as well as during shocks or crisis. • Communities have no mechanism to support the disadvantaged people (such as lonely elderly, disabled, street children etc.), especially during shocks or crisis.

Question 4.2. How do you assess the adherence and harmony among different groups of population living together in the neighborhoods?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Population groups of different ethnicities, religions, places of origin live together in harmony, without conflict and discrimination. • People living in neighborhoods have close and supportive relationship, without discrimination in living and working conditions, education, ethnicity etc. • Opportunities are equally shared among all citizens across the city. • Joint cultural and sport activities, festivals are regularly organized among people of different ethnic groups.	• There is a significant tension and conflicts often happen among the population groups of different ethnicities, religions and cultures. • It is not uncommon that people are separated because of difference in ethnicity or economic conditions. • There is a significant disparity among different population groups in accessing job opportunities, community activities, social and cultural networks. • Joint cultural and sport activities, festivals are rarely organized among people of different ethnic groups.

Question 4.3. How do you assess the city's cultural identity?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• People love and are proud of their neighborhoods. • Some communities with outstanding identity are acknowledged by the others as a contribution to the city cultural value. • Collective activities (art performance, sport etc.) attract participation and support of majority of the city's population. • Diversified festivals, traditional markets, religious activities are common that increases the coherence among the people.	• Community cultural identity is weak. People rarely feel they belong to their neighborhood and are not proud of their community. • Some communities have outstanding identity which conflicts with or weakens the city's identity. • Collective activities are rarely organized in neighborhoods. • The city lacks public spaces. Festivals and other events are rarely organized in the city.

Question 4.4. How do you assess the contribution of private businesses to the city?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Private businesses actively support social activities, such as providing scholarships to poor pupils and students, making contribution to the funds that support the poor and to maintaining the traditional cultural identity. • Private businesses commit to employ local workforce and the poor, the disabled living in the city. • The culture of social responsibility is a common sense amongst private businesses.	• The private sector makes few efforts to social contribution. • Private businesses have no commitment to employ local workforce and the poor, the disabled living in the city. • The culture of social responsibility does not exist amongst private businesses.

Goal 5. Security and rule of law (Question 5.1-5.3)

Question 5.1. How do you assess the effectiveness of the city's system to prevent and deter crime?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city implements a program to prevent and deter crime and violence that attracts the participation of various stakeholders including communities. • The province/city has a system in place to receive and process crime information that is effective and safe for the crime reporters. • People actively contribute to building communities that say "no" to crime and drug use. • The province/city has a program in place to promote social re-integration for released criminals, which includes education and training, behavioral treatment, addiction dependency treatment, mentoring and coaching financial and life skills. • Urban planning is rational and safe. All streets and lanes have lightings to ensure out crime from the city. • The city's departments have sufficient staffs and facilities to ensure laws and regulations are well conformed, and punishment measures are strict for effective warning. The functional forces undertake patrols to ensure good social order and strictly handle the violation cases.	• There is no program to prevent and deter crime. Measures to deal with crimes often are taken only after crime happens. • The crime information receiving system does not exist or is not effective. • People are nonchalant to crime, assuming that crime is the government responsibility. • There is no mechanism in place to support the convicted criminals in reintegration. • Principles of safe urban design to ensure out crime from new developments are not applied. • The city's departments have not sufficient staffs and facilities to ensure laws and regulations are well conformed. The patrols are not seriously undertaken, and violations are not strictly handled.

Question 5.2. How do you assess the ability of the city's forces in charge to respond to emergencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has concrete plan in place to engage, coordinate, monitor and manage emergency response forces to undertake their tasks during emergencies. • Roles and responsibilities are clearly defined for each of security forces (such as ambulances, rescue force, emergency response steering committees at all levels, police, army, volunteers etc.) in dealing with emergencies. • The city's plan to respond to disasters as well as communication channels to security forces are clearly informed to the residents. • The city allocates enough budget for disaster responding activities and organizes yearly practicing of responding to disasters, attracting the participation of all forces in charge as well as the residents.	• The city has no concrete plan in place to engage, coordinate, monitor and manage emergency response forces to undertake their tasks during emergencies. • Roles and responsibilities are not clearly defined for each of security forces in dealing with emergencies. • Communication channels to security forces are not clearly informed to the residents • Budget for disaster responding activities is not enough and not well allocated. • Practicing activities of responding to disasters is not implemented on yearly basis and not fully attracting the participation of all forces in charge or the residents.

Question 5.3. How do you assess the city residents' access to legal support system?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The legal system is fair and respects individual rights of both victims and defendants, regardless of person's income, ethnicity, sex or religion. • The court decisions are not affected by personal interests or interest groups. • Citizens have access to affordable legal support service (legal advice and representation). • Cases are heard in a timely manner without undue delay to proceedings, determinations, sentencing or appeals. • The province/city has a website where the court process and results are publicly reported, the citizens' information and contribution to the legal support system and to the justice/court system are received.	• Mechanisms to protect the rights of victims and defendants during court proceedings are absent or largely ineffective. • The court decisions are often affected by personal interests or interest groups. • Legal advice and representation services are far not affordable for majority of people. • Cases are often heard with delays, not conforming the proceeding regulations. • The city has no mechanism in place for publicizing information and receiving citizens' opinion on the activity and quality of legal support system and justice system.

Goal 6. Sustainable economy (Question 6.1-6.5)

Question 6.1. How do you assess the city's public finance resource and management?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has a healthy budget to pay for entire city government operation and to cover a significant amount of need incurred from a major event (including plans to recover technical infrastructure, people's livelihood and post-shock economy). • The province/city has a mechanism in place to access additional capital for emergency situations from the regional or national sources. • Decisions on city budget allocation are based on accurate, up-to-date data. The city has a mechanism in place to regularly review and update funding needs and planning. • All actions necessary for disaster resilience are included in the concrete budget lines. • The province/city has a transparent, efficient system of natural resource fee and tax collections which is independently audited and publicly reported.	• The city constantly experiences budget shortfalls in funding to cover city government operation. • The province/city has no ability to mobilize capital/financial support for emergency situations. • There is no mechanism in place to access additional capital for emergencies from the regional or national sources. • The province/city's budget does not include costs for actions necessary for disaster resilience or is not enough for them. • The system of natural resource fee and tax collections is not transparent, not independently audited nor publicly reported.

Question 6.2. How do you assess the province/city's mechanism to support enterprises to adapt to changes and continue their business following a shock?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has developed a detailed inventory of business sectors and individual businesses critical to the continuity of city functions post-shock. • The province/city has a mechanism in place to encourage and guide businesses both big and vulnerable ones to develop their business continuity plans to deal with possible shocks or disasters. • The province/city organizes regular dialogues with businesses to acknowledge their difficulties, recommendations, experience/innovative sharing toward the continuity and development post-shock.	• The province/city lacks a detailed inventory of business sectors and individual businesses critical to the city, or it is not complete or out of date. • The province/city has no mechanism in place to encourage and guide businesses to develop their business continuity plans to deal with possible shocks. • The province/city has no mechanism in place to update information of city's businesses.

Question 6.3. How do you assess the city's economic competitiveness?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city's economy demonstrates stable long-term growth or has shown faster rebound from disruptive economic shocks than regional cities. • The city's economy is based on high value-added intelligence and high-tech. • The city has a strong middle-class economy. • The city's economy has a diverse sectorial base with easy entry to employment and creation of new businesses. • The contribution of the informal economy is recognized and quantified in the city's economic reports. • Economic planning is coordinated with the wider regional area. • The provincial/city government takes an active role in exploring and promoting new market opportunities.	• The city's economy is exposed to uncertain fluctuation in growth, demonstrating lower economic strength than other cities. • The city's economy is characterized by lower value goods or raw materials and heavy labor use. • The city lacks a strong middle-class economy and has a significant wage gap. • The city's economy is exposed to disruption due to its reliance on a few economic sectors or employers or has barriers to entry to employment. • The informal economy is not recognized. • Economic planning is not coordinated with the wider regional area. • There is no mechanism in place to explore and promote new market opportunities for the city.

Question 6.4. How do you assess the city's business environment?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has a comprehensive strategy to attract business investment from outside the city that suits the city's priorities, with clear roles and responsibilities of each of concerned parties. • The city is perceived as a competitive business environment, with effective and transparent regulations on protection of property ownership. • The city is able to retain and attract businesses and recent graduates. • The province/city proactively identifies gaps within its infrastructure service delivery that may prohibit or discourage business investment. • The province/city proactively trains local workforce to quickly meet the labor requirements of businesses.	• The city does not have a strategic plan to attract business investment from outside the city. • The city is perceived as a difficult and unreliable environment for doing business. • Businesses show a high or increasing trend in closing or relocating outside the city, and new graduates move away from the city. • There are gaps in infrastructure service delivery that prevent or discourage businesses from investing or remaining in the city. • Businesses are not able to match their employment needs.

Question 6.5. How do you assess the city's integration with regional and global economies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The city has strong, collaborative partnerships with other cities to promote strong economic relationships. • The city has a comprehensive plan to develop and maintain partnerships, with roles and responsibilities clearly defined • The city leads regional or national average in the percentage of export in total production to regional, national and international markets. • City infrastructure fully support the business needs and provides an attractive environment for investment.	• The city has no economic relationships with other localities. • The city has no clear strategy to develop economic relationships with other cities and regions. • The city stays behind regional and national average in exporting to other localities. • Poor infrastructure makes the city not attractive for businesses.

III. INFRASTRUCTURE AND ENVIRONMENT

Goal 7. Reduced exposure and fragility (Question 7.1 – 7.4)

Question 7.1. How do you assess the city's mapping of hazard and exposure to natural disasters and climate change?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Comprehensive assessments on exposure and vulnerability to natural disasters and climate change have been undertaken across the full extent of the city within the past 5 years. • Maps have been produced showing the areas of the city at most risk from hazards of natural disasters and climate change, which is updated and widely disseminated to government agencies and the citizens. • Comprehensive hazard risk assessments have been undertaken that identify long-term stresses present in the city and consider them in the city's emergency response strategy.	• No assessment has been made on the hazards facing the city within the past 5 years. • No city's hazard maps have been produced. • No hazard risk assessments have been undertaken for identifying long-term stresses. The long-term risks are not considered in the city's emergency response strategy.

Question 7.2. How do you assess the city's conformance of construction and urban infrastructure management regulations toward risk mitigation?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Codes and standards for urban planning, design, construction, operation and maintenance (housing, public objects etc.), technical infrastructure (electricity, water supply, sewerage etc.), protection works (sea dykes, retaining walls etc.) are valid and strictly adhered to following the approval by the competent authorities. • Relevant design and construction codes and standards are widely disseminated to the residents. • Regulations are in place on reviewing and updating recent risk parameters to the Building Codes used for building and technical infrastructure (within five years or less). • Construction guidelines that consider disaster risks are widely introduced on mass media.	• Construction regulations and standards are not well conformed. • No concrete guidelines are available for construction regulations. In many cases, construction standards are not conformed. • All codes used for infrastructure and building construction have expired (older than 15 years). • Construction codes and standards are not disseminated to the residents. • No requirements, procedures nor mechanism in place to ensure that Building Codes for buildings and infrastructure are reviewed and updated on the most recent risks or disasters to serve the purpose of forecasting long-term risks.

Question 7.3. How do you assess the city's ability to protect and maintain the ecosystems under the impact of the climate change ***(e.g. greenery, lakes and rivers etc.)***?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has a robust mechanism to proactively protect and maintain the ecosystems that provide good living environment and/or protective functions for the city. • The city's important ecosystems have not been significantly destroyed or degraded during the past 15 years. • The province/city has plans and initiatives to enhance the health and protective functions of ecosystems, if degraded. • The province/city has a program in place to assess the ecosystems and identify important ecosystems that have protective functions to the city.	• The province/city has no effective mechanisms in place to protect and maintain ecosystems that provide environmental services and/or protective functions for the city. • The important ecosystems have been significantly destroyed or degraded during the past 15 years. • No proposal or plan in place to enhance degraded ecosystems. • No program in place to assess the important ecosystems within or outside the city that have protective functions to the city.

Question 7.4. How do you assess the city's management of protective infrastructure (e.g. dykes, dams, water drainage)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has established a complete profile of the city's protective infrastructure. • The province/city has a formal requirement in place to regularly review the adequacy of the city's protective infrastructure assets (every 5 years or less). • The province/city undertakes risk assessment under different types of natural disasters. • The province/city has programs in place to upgrade the city's protective infrastructure based on the findings of hazard exposure assessments and predictions of future stresses (scenarios).	• No records of the city's protective infrastructure exist. • The province/city has no requirement in place to regularly review the adequacy of the city's protective infrastructure assets based on risk assessments under different types of disasters and long-term change scenarios: • The province/city does not undertake risk assessment under different types of disasters during the past 15 years. • The province/city has no program in place to upgrade the city's protective infrastructure. There are no clear responsibilities for the maintenance of protective infrastructure.

Goal 8. Effective provision of critical services (Question 8.1 – 8.5)

Question 8.1. How do you assess the city's stewardship of ecosystem?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has identified, assessed and understood the benefits provided to the city by ecosystems within or outside the city. • The province/city has a mechanism in place to ensure ecosystem information is considered during city government policy development and decision-making. • The province/city has extensive policies and robust regulations in place to protect important ecosystems and natural resources. • Natural areas such as coastal sand dunes, wetlands, and important water sources are included in the city's infrastructure planning.	• The province/city has not identified and assessed the benefits provided to the city by ecosystems within or outside the city. • The province/city has no policies or regulations in place to protect important ecosystems and natural resources; or not implement them. • Ecosystem information is not considered during province/city government policy development and decision-making. • The province/city has no program in place to manage and protect city's important ecosystems. • Natural areas such as coastal sand dunes, wetlands and important water sources are not included in the city's infrastructure planning.

Question 8.2. How do you assess the city's current status of public critical infrastructure and that in a long term?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has a city-wide long-term strategic planning (≥ 15 years) in place to provide critical public infrastructure to meet the anticipated needs and to respond to the climate change. • Plan is regularly reviewed and updated (minimum every 5 years). There is a mechanism in place to ensure that current and future programs to increase capacity and/or upgrades align with this plan. • There are diverse power generation and supply and water supply systems serving the city, so should one of these systems fails, resulting in no loss of service provision across the city. • The solid waste management system has multiple options to support the waste reduction, reuse, recycling and disposal, attracting the participation of both state-owned and private stakeholders.	• The province/city has no city-wide long-term strategic planning (≥ 15 years) in place to provide critical public infrastructure to meet the anticipated needs and to respond to the climate change. • The current programs (if any) to increase capacity or upgrade infrastructure are of a corrective nature, short-term and not based on a long-term and city-wide plan. • There are only one or a few power generation/supply and water supply systems, so should one of these systems fails, it would affect the electricity and water supply across the city. • The solid waste management system is just a traditional waste collection and burying.

Question 8.3. How do you assess the retained spare capacity of city's critical infrastructure services **(power, water supply, water drainage, waste management)**?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The critical public infrastructure is provided by diversified sources. There are alternative sources of energy such as wind power, solar power; water sources include wells and reservoirs; there are various options for waste reducing, reuse, recycling and utilization of organic waste etc. • There is sufficient capacity of electricity supply, water supply and solid waste management systems to meet current needs. • There is sufficient capacity to provide emergency services in case a network fails due to natural disasters. For example, hospitals have backup generators, many families have water reservoirs, and mobile phone wave transmitters can quickly be back to work.	• Current water and electricity supply are not diversified and there is no program in place to reduce or recycle waste. • Power supply, water supply and solid waste management systems are not sufficient to meet current demand. • There is an inability to provide emergency services in the event of network failure due to natural disasters. For example, hospitals do not have backup generators; homeowners have no water reservoirs; there is inability to put mobile phone wave transmitters back to work.

Question 8.4. How do you assess city's management plan (supervision, monitoring, maintenance, new developments) for critical infrastructure (water supply, water drainage, power supply, sanitation and waste management) as well as continuity plan to ensure they can respond to emergencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Critical service providers regularly monitor, maintain, and upgrade the infrastructure. • Equipment is operated by skilled and knowledgeable staff who may be certified through local and national standards to manage their systems during times of crisis. • There are independent agencies with legal mandate to oversee the activities of the electricity and water providers. • Hazard risk assessments are undertaken on a regularly basis (every 5 years) to consider the probability and severity of service disruptions during a disaster or long-term climate change scenarios: • Critical service providers build and strictly comply with plans for emergency response and recovery and maintaining service continuity during and after disasters.	• There is no mechanism in place to ensure that the electricity and water supply infrastructure is regularly monitored, maintained and upgraded as required. • There is a lack of skilled workers who are certified and trained / retrained regularly. • There is no independent body with legal mandate to oversee the activities of the electricity and water providers. • No hazard risk assessments have been undertaken to consider the probability and severity of service disruptions during a disaster or long-term climate change scenarios: • There are no requirements for critical service providers to build plans for emergency response and recovery and maintaining service continuity during and after disasters. There is no evidence that such plans exist.

Question 8.5. How do you assess the possibility of continuity for the city's critical assets and services in case of emergencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The critical assets and services for effective operation of the city (e.g. hospitals, government administrative buildings, emergency response centers, data centers) have been identified during a process that has involved input from key stakeholders. A register of these critical assets and services exists and is regularly reviewed and updated. • All critical assets and services have emergency standby electricity generators or substitute energy sources and are prioritized for power supply when are back in operation. • All critical assets and services have adequate emergency water supply, including water stored in tanks, bottled water, or onsite water filtration. These important assets are also prioritized for recovery post-shock.	• The city is not interested in identifying the critical assets and services (e.g. hospitals, government administrative buildings, emergency response centers, data centers etc.) • There is no evidence showing that critical assets and services have emergency standby electricity generators or substitute energy sources or are prioritized for power supply when are back in operation. • There is no evidence showing that critical assets would have or not water supply during emergencies and be prioritized for recovery post-shock.

Goal 9. Reliable mobility and communications (Question 9.1 – 9.4)

Question 9.1. How do you assess the city's transport system (diversity, transportation capacity)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The road networks are adequate for demand, with drivers able to take alternative routes when disruptions occur within the network. • The road network effectively supports both journeys from outer areas into the city center as well as radial journeys across or around the city. • Large-scale traffic congestion is rare. Essential city services and facilities (e.g. schools / hospitals / workplaces) are widely distributed across the city. • Information is available to users of the road network on real-time journeys (e.g. radio, signage, temporary streaming etc.) • The city's public transport network is affordable and accessible for all people across the city, providing access to relevant destinations. • The city has a plan in place and initiative to better organize traffic (e.g. pedestrians, bicycle lanes, car sharing etc.) and mobilize the private sector to provide public transport services.	• The city's road network is overloaded, especially in the city center area, has difficulties in supporting both journeys from outer areas into the city center as well as radial journeys across or around the city. • Large-scale congestion occurs frequently, causing significant delays for people involved in traffic. • Essential services and facilities (e.g. schools / hospitals / workplaces) are concentrated in clusters, causing traffic congestions. • There is little or no information available to people involved on real-time journey (e.g. radio, signage, temporary streaming etc.) • The city's public transport network is not affordable nor accessible for the people to reach relevant destinations across the city. • The city has no plan in place nor initiative to better organize traffic (e.g. pedestrians, bicycle lanes, car sharing etc.)

Question 9.2. How do you assess the city's programs and plans for emergency response and early recovery of transport network during and after disasters?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has a plan in place to ensure continuity of transport service during and following an emergency, which is based on current data or modelled hazard for anticipating emergency situations. • The province/city tests and reviews on regular basis the above plan (through theoretical modelling or real-life practice and drills). • The province/city has a mutual assistance agreement in place between transport providers to ensure continuity of transport services in the event of natural disasters. • The province/city has a mechanism to identify and sign-post emergency access routes and communicate them to people. • The province/city has a plan in place for long-term maintenance, upgrading of major transportation infrastructure (e.g. roads, railways, bridges). • The province/city has sufficient financial resources for the construction, operation and maintenance of transport systems coming from various sources such as loans, government bonds, taxes and fees etc.	• The province/city has no plan in place, or plan is not complete to ensure continuity of transport service during and following an emergency. Or the plan has not been tested, checked, is based on old data, or disregards hazards and emergencies. • There is no mutual assistance agreement made between transport providers to ensure continuity of transport during emergencies. • The province/city has no a mechanism to identify and sign-post emergency access routes to guide people. Or the emergency access routes are not communicated to people. • The province/city has no plan in place for long-term maintenance, upgrading of major transportation infrastructure (e.g. roads, railways, bridges). • The province/city does not have sufficient financial resources for the construction, operation and maintenance of transport systems. Or has maintenance plans but no budget to implement them.

Question 9.3. How do you assess the warning ability of the city's emergency information system?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has plans, tools and mechanisms in place for warning businesses and households of emerging hazards and suggested responses. • The warning systems are regularly tested with clear roles and responsibilities. • The province/city has robust communication plans to warn and assist people at risk of impact by a crisis, especially the most vulnerable people. • The province/city ensures that the emergency information system is accessible throughout the public.	• The province/city has no mechanism in place for warning businesses and households of emerging hazards and suggested responses. • Or the province/city has a warning system but outdated, not tested. • The province/city has no appropriate communication plans to warn and assist people at risk of impact by a crisis. Or the most vulnerable people cannot access them. • The province/city does not have or has not sufficient information technology that would speedily and reliably enable people and businesses to communicate in emergency situations.

Question 9.4. How do you assess the city's information and operational technology systems (hardware and software that control and monitor public infrastructure facilities such as traffic signals, waste water treatment, network security etc.)?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• There is a sufficient communication infrastructure throughout the city, enabling the coordination of agencies and staffs in charge to prepare and response to emergencies. • The information infrastructure system has sufficient capacity and diversity to ensure good communication in a surge of data demand following an emergency. • Communication infrastructure responds well to emergencies that the city may face. • The province/city has robust plans, strategies and mechanisms in place for the safe, long-term storage and back up of city government data. • The above plans are updated and checked on a regular basis. The roles and responsibilities of parties involved are clearly defined. • There are mechanisms in place to protect the city network security and sensitive data. • The province/city ensures that hardware and software that control and monitor public infrastructure, such as traffic lights, power grids, pumping stations and space control systems, are safe when the city networks are attacked. • The province/city has mechanisms in place for online monitoring to detect new vulnerabilities and threats for the security of OT infrastructure. • There is a mechanism in place to coordinate a response in the event that the hardware and software that control and monitor the public infrastructure systems are compromised.	• The province/city has no technology/ insufficient communication infrastructure that would enable agencies and staffs in charge to reliably coordinate during/after an emergency. Or the province/city has communication information technology which has not been tested or is not reliable. • The province/city has no plans, strategies or mechanisms in place for the safe, long-term storage and back up of city government data. • Or the province/city has a plan in places which has not been tested. • Hardware and software that control and monitor public infrastructure, such as traffic lights, power grids, pumping stations and space control systems, are not safe when the city networks are attacked. • There is no mechanism in place to coordinate a response in the event that the hardware and software that control and monitor the public infrastructure systems are compromised.

IV. LEADERSHIP AND STRATEGY

Goal 10. Effective leadership and management (Question 10.1 – 10.5)

Question 10.1. How do you assess the transparency and accountability of the city's decision-making process?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Community consultations are carried out in the formulation, implementation and revision of policies and plans. • People have access to city's documents, data and records. • The province/city responds to recommendations of people, organizations and enterprises on the changes in the city's policies, regulations and plans. • The province/city publishes data on the city budget sources, balance of the city revenue against the expenditures from time to time. • There are robust procedures on open public bidding and transparent selection of the winners.	• No community consultations carried out in the formulation, implementation and revision of policies and plans. • People do not have access to documents, records and records of provincial/city authorities. • The province/city does not respond to recommendations of people, organizations and enterprises on the changes in the city's policies, regulations and plans. • The province/city does not publish data on the city budget spending nor the city plan to meet its objectives and targets. • There are no transparent procedures on public bidding and selection of the winners.

Question 10.2. How do you assess the coordination and information exchange among the city's government agencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• There are mechanisms in place to ensure effective communication and coordination between the government agencies. • There are effective mechanisms in place, with strict objectives and procedures, clear roles and responsibilities, for coordination and information sharing among the government agencies. • Government staffs who have good relationships with their colleagues and are willing to share information will be more trusted and likely to receive information related to them from other departments. • The coordination mechanism is applied to different types of planning, with consistent guidelines. Meetings among relevant parties are regularly organized.	• There is no effective mechanism in place for coordination between the government agencies in urban planning and development. • There is no mechanism to ensure effective communication and cooperation between municipal agencies. • Staffs of different departments do not have a good inter-relationship at work. • There is no coordination and operation mechanism applied for different types of planning. Guidance is not consistent, and regular meetings are not organized.

Question 10.3. How do you assess the city's multi-stakeholder collaboration in policy-making and decision-making?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• There are organizations (e.g. mass organizations, advocacy groups, NGOs, business associations and professional organizations) that work actively to represent the interest and views of their members to the city government. • The city has a policy that clearly identifies when consultation with business, professional and social organizations must be undertaken. For important projects or policy revisions, consultations are conducted at very early stage. • There is a mechanism in place to enable people establish on-line or off-line groups to discuss policies that are important to them.	• Business and professional associations, social organizations rarely give their views and opinions to city leaders on the city's plans and policies. • The city rarely consults with social, professional and business organizations on city plans and policies. • People are not encouraged to establish groups (both on-line and off-line) to discuss policy issues that are important to them.

Question 10.4. How do you assess the city's hazard monitoring and risk assessment?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• A multi-sectoral (involving key emergency stakeholders) risk assessment mechanism exists which ensures that findings are integrated into the provincial / city decision-making process. • Risk assessments are based on the up-to-date information on the city's hazards profile and consider risks and vulnerabilities including cross-sectoral issues which can impact upon the impact of various hazards. • There are mechanisms in place to exchange hazards-risk information up and down, between the national government, province/city and local community. • There is an early warning mechanism / coordination between hazard monitoring agencies (e.g. weather office, seismology center) and local emergency response units. • Alerts are based on timely and accurate information. The mechanism is tested regularly.	• There is no comprehensive multi-sectoral risk assessment mechanism (involving government, police, fire, emergency, health, research institute, mass organizations and other stakeholders). • There is no mechanism in place to exchange hazards-risk information between the government authorities and local community. • There is no early warning mechanism / coordination between hazard monitoring agencies (e.g. weather office, seismology center) nor a local emergency response unit.

Question 10.5. How do you assess the city's preparation to respond to emergency scenarios?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• There are robust mechanisms in place to ensure that government functions are fully in force in emergency situations. • The province/city has full power to effectively facilitate emergency planning. • The province/city has an emergency response committee involving multiple agencies at both strategic and operational levels. The representatives of member agencies meet regularly (e.g. every quarter). This committee is responsible for assessing the hazard risk and undertaking community awareness building.	• There is no mechanism in place to ensure that government functions are fully in force in emergency situations. • The province/city has no power to effectively facilitate emergency planning. • The province/city has an emergency response committee, or if so, the roles and responsibilities in case of emergency are not clearly defined.

Goal 11. Empowered stakeholders (Question 11.1-11.3)

Question 11.1. How do you assess the city's education system?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The state provides free primary and junior secondary education to all children. • Levels of educational attainment within the working age population are very high (high school diploma or above). • University education is accessible and affordable to all people. • A large portion of the working age population has a university degree or a certificate from an equivalent education institution. • There are accessible opportunities for citizens to continue to develop new skills and knowledge. • There is no gender disparity in accessing education and training.	• The education level of people within the working age is very low. • Most the working age population have not yet completed primary education. • People have limited access to university education due to the high costs. • Children of disadvantaged groups have no access to school. • There are gender disparities in accessing to education and training.

Question 11.2. How do you assess the city's achievements in building community awareness of hazard risks and guiding the protection of people's life and property during emergencies?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city strives to raise awareness of hazard risk to communities living in exposed areas and to guide them on risk mitigation and protection of people's life and property. • The province/city has plans and strategies in place to communicate to the public information on hazards and risk reduction measures in emergencies. • There are free up-to-date guidelines and other measures to support people and businesses to better respond to disasters. • There is a network of community volunteers that can be engaged in emergency preparation, response and recovery efforts. These activities are to ensure that all citizens can be evacuated and assisted in the emergencies that the city may face.	• No effort has been made to raise awareness of hazards to communities living in exposed areas or to guide them on risk mitigation and protection of people's life and property. • No plan or strategy in place has been communicated to the public on hazards and risk mitigation measures. • There is no guidance, advice or other types of assistance to help businesses better respond to disasters. • No program in place to educate households on protection of home and family property from major hazards • There are lots of hazards but few volunteers at the community level that are trained to participate in preparation, response and recovery efforts. There is no mechanism in place to ensure the community is well prepared for emergency cases.

Question 11.3. How do you assess the communication and cooperation between the city government and the public?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• There are programs or strategies in place to maintain diverse mechanisms for communication and coordination between local government and the public (e.g. websites, radio, television, social networks, online forums, word of mouth). • Information is available in the minority languages spoken within the city and in Braille (for the blind people). • There is an effective communication between the city government and the people, which helps the government get feedback from people.	• There are no programs or strategies that maintain effective and diverse mechanisms for communication and coordination between the city government and the public. • Communication is rarely done in minority languages and in Braille. • Communication between government and people is not effective and the government does not receive feedback from people.

Goal 12. Integrated development planning (Question 12.1 – 12.4)

Question 12.1. How do you assess the integration of hazard assessment and climate change scenarios into the city planning?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The development of current policies and planning (land use, housing, poverty, employment, environment, ecosystems, infrastructure and critical services, risk assessment ...) is done with reference to the findings of up-to-date (within the past 5 years) and comprehensive assessments of risks associated with hazards and long-term change scenarios: • There are no residential populations located within areas that have been assessed as high risk from hazards, or very few people reside in such areas. There are comprehensive plans in place to relocate vulnerable populations to safer areas. • All background data, GIS database are consistent with reference frame and widely shared for application.	• The development of current policies and planning (land use, housing, poverty, employment, environment, ecosystems, infrastructure and critical services, risk assessment ...) is done without reference to the findings of up-to-date (within the past 5 years) and comprehensive assessments of risks associated with hazards and long-term change scenarios: • A large portion of population are living within areas that have been assessed as high risk from hazards and there are no policies or plans to relocate vulnerable populations to safer areas. • The planning maps of different sectors are often inconsistent, even conflicting.

Question 12.2. How do you assess the transparency and stakeholder participation in the consultation processes for the city's development of urban development strategy and planning?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Provincial/city staffs present issues and proposed solutions to local communities, mass organizations, village/commune leaders and discuss their recommendations before deciding on planning options. • The disadvantaged populations (the ethnic minorities, the poor, the disabled etc.) are directly and sufficiently consulted in the development process of urban development strategies and planning. • The findings of consultations are made publicly available in writing to the people consulted, and on the mass media. • All essential service providers (electricity, water, sanitation and transport) are sufficiently consulted during the development process of urban development strategies and planning.	• Provincial/city staffs do not present issues and proposed solutions to local communities, mass organizations, village/commune leaders nor discuss their recommendations before deciding on planning options. • The disadvantaged populations (the ethnic minorities, the poor, the disabled etc.) are not directly nor sufficiently consulted in the development process of urban development strategies and planning. • The findings of consultations are not made publicly available in writing to the people consulted, nor on the mass media. • Essential service providers (electricity, water, sanitation and transport) are not sufficiently consulted during the development process of urban development strategies and planning.

Question 12.3. How do you assess the quality of city's land use planning, zoning planning and detailed planning?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• Land use planning approved by provincial/ city authorities covers the whole city, identifies appropriate density for different areas, protects and enhances ecosystems, preserves public green spaces and encourages the use of public transport. • The city's general land use planning and functional subdivisions of city land use planning are developed taking into account predictable future changes in spatial development, economic development, growth prospects, demographic change (age, health, culture group), job opportunities, hazards and vulnerability, housing / transport / infrastructure needs, informal residential areas, social spaces and social services, requirements of essential infrastructure capacity, environment and ecosystems, availability of budget / finance. • The province/city has mechanisms in planning activities to consider the needs of enterprises.	• The province/city does not have land use planning for identifying the development zones or development types that are appropriate for different city areas. • The province/city does not have mechanisms applied for planning activities to address the needs of enterprises. • The province/city does not have mechanisms in place to update important strategies and planning (done more than 10 years ago) nor to forecast/assess the vulnerability trends. • The province/city does not consult key stakeholders nor citizens on development strategies and plans.

Question 12.4. How do you assess the consultation of city's departments with emergency response agencies in the development process of planning and projects?

10	9	8	7	6	5	4	3	2	1

Assessment scenarios:

Best Case Scenario (Score=10)	Worst Case Scenario (Score=1)
• The province/city has formal requirements to consult city emergency response agencies that enforce the implementation of building codes during the planning approval process. • The city proactively implements the required consultations in accordance with regulations.	• There are no formal requirements to consult city emergency agencies that enforce the implementation of building codes during the planning approval process and this has rarely been implemented in a formal planning approval process. • There is no formal planning approval process, or such process is not explicitly implemented.

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