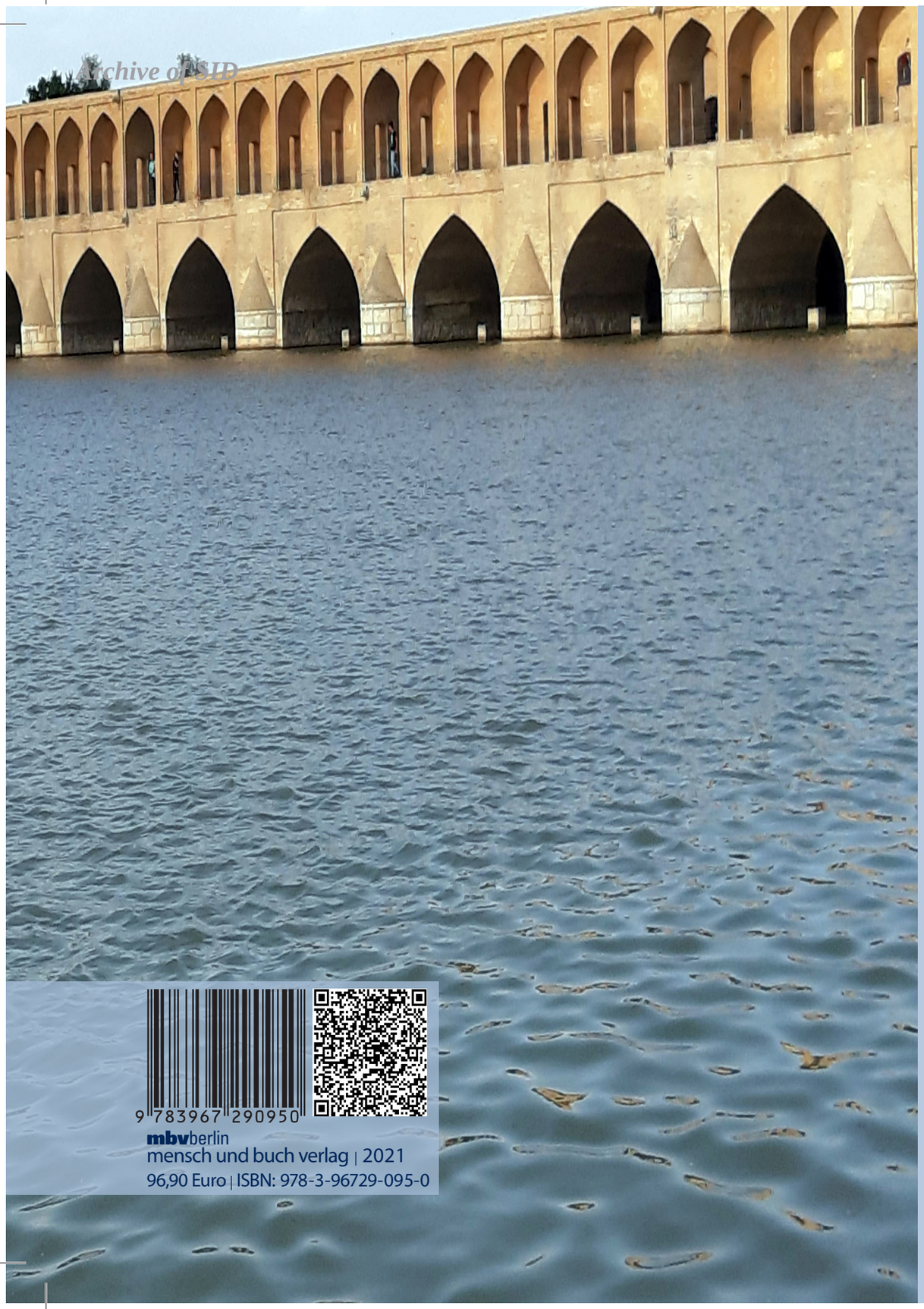

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mbvberlin
mensch und buch verlag | 2021
96,90 Euro | ISBN: 978-3-96729-095-0

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Responding to Challenges of Climate Change through Intercultural Dialogue

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Hasan Sinemillioglu - Mathias Kaiser (Hrsg.)

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عنوان :

بررسی رویکرد CRPT در ارزیابی تاب آوری شهر اصفهان در اثر تغییرات اقلیمی

Investigation of CRPT Approach in Assessing Resilience of Esfahan due to Climate Change

گروه تخصصی: فنی مهندسی

سازمان مجری :دانشکده معماری و شهرسازی مؤسسه آموزش عالی دانش پژوهان پیشرو و دانشکده برنامه ریزی فضایی دانشگاه صنعتی دورتمند آلمان

نوع طرح: پروژه مشترک با دانشگاه صنعتی دورتمند حمایت شده توسط مرکز تبادلات آکادمیک آلمان (DAAD) در چهارچوب برنامه Higher Education Dialogue with Islam World

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تاریخ خاتمه: ۱۳۹۹

کارفرما :دانشگاه صنعتی دورتمند آلمان و مؤسسه آموزش عالی دانش پژوهان پیشرو

خروجی طرح : کتاب: برنامه ریزی در آلمان و ایران – پاسخگویی به چالش‌های تغییر اقلیم از طریق گفتگوی میان‌فرهنگی

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تلفن: ۰۳۱-۳۷۷۷۹۹۱۴-۱۹

نشانی سازمان مجری : اصفهان، بلوار کشاورز، نبش چهارراه مفتح

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This publication has been funded by the DAAD
German Academic Exchange Services

DAAD Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

Bibliografische Information der *Deutschen Nationalbibliothek*
Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <https://dnb.de> abrufbar.

ISBN: 978-3-96729-095-0

Umschlagabbildung | Umschlaggestaltung: Mais Jafari

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verlag@menschundbuch.de – www.menschundbuch.de

8.

Investigation of CRPT[4] Approach in Assessing Resilience of Esfahan due to Climate Change

Zoha Meisami, Amir Masoud Samani Majd, Mahya Kondori, Elham Ghasemi

Abstract

Nowadays, cities and citizens face new and amplified challenges due to rapid urbanization, a changing climate and political instability. These issues raised citizens' vulnerability to hazards and can worsen disasters. Thus, urban system's measurable ability for having access to the resource of information related to its inhabitants to survive through all shocks and stresses while positively adapting and transforming toward sustainability, which is called Urban Resilience. One of the approaches is CRPT. CRPT is a very useful tool in the face of climate change because climate change should be analyzed in an evidence-based way. CRPT makes this possible because it is a comprehensive approach to climate measures. It combines climate-related risks through a holistic analysis of the physical, organizational, functional, and social environment. In this paper, we are going to find a proper tool to measure urban resilience in Esfahan. A simple review is used as the methodology in this research. The result shows that CRPT can have the highest compatibility with Esfahan. Establishing communication between the city of Esfahan and the UN provides a chance for the city to be able to use this tool. In order to, urban resilience should be measured, and basic steps should be taken in the global resilience program. So, preparing CRPT for Esfahan with a local look can help provide new plans and solutions to increase the city's resilience.

Keywords: CRPT (City Resilience Profiling Tools), Climate change, Resilience, Esfahan

[4] UN Habitat's City Resilience Profiling Tools

1. Introduction

In recent decades, the rate of natural disasters caused by the effects of climate change has grown significantly in terms of severity and diversity (EMDAT, 2019), and this trend is expected to continue in the future (UNISDR, 2005). All cities face natural and human shocks and pressures such as earthquakes, floods, rapid migration, cyber-attacks, and today. As a result of rapid urbanization, climate change, and political instability, cities and citizens face new challenges. With the increase of these phenomena, the population's exposure and vulnerability to dangers increase and can cause or worsen disasters and affect urban areas more (UNSDR, 2015). Because population density, resources, and activities are located in cities, and when it is associated with the impact of climate change and increasing poverty, urban density leads to new stresses. Many people settle in potentially dangerous areas such as unstable hills, floodplains, or coastal areas because they do not have access to safer land] (Sharifi & Yamagata, 2016). Expansion of informal settlements also implies lack of infrastructure and basic services and inadequate housing construction, which increases the vulnerability of communities. The effects of climate change have caused more stress in urban areas. In order to reduce their negative impact on the people, the international community has increasingly realized that cities need to be addressed by strengthening the capabilities of local governments and their local partners (stakeholders). The feature that helps in this way is resilience (Cutter, 2016); (Foundation & Arup, 2015) UN-Habitat, 2017).

UN-Habitat, the United Nations Human Settlement Program, defines urban resilience as the measurable ability of any urban system. It can withstand all shocks and pressures while evolving towards sustainability with positive adaptation (UN-Habitat, 2017). Sustainability represents a turning point between different but at the same time similar paradigms in urban development. To be truly resilient, cities must strive for sustainability to take advantage of long-term positive effects. And of course, to achieve sustainability goals, the city needs to be resilient (Khazai et al., 2015); (UNISDR, 2015); (Williams, Nolan, & Panda, 2014).

In this research, City Resilience Profiling Tool has been used and the reason for choosing it as an evaluation tool of Esfahan will be explained.

The city of Esfahan is located in the plains of Esfahan province, which is formed by the Zayandehrud River. This plain and river lead with a gentle slope to Gavkhouni swamp in the southeast of Esfahan (Amirzadeh, 2018). This sedimentary plain in the Zagros Mountains eastern part has always been the most fertile plain of the Central Plateau of Iran. Zayandehrud

River is at risk of intermittent drought cycles, and neglecting its ecological balance in recent years has caused irreparable damage to its environment and surrounding spaces. After Zayandehrud River, Madis is of special importance as vital arteries in the urban context (Bavand, 2007). Madis are branches of the Zayandehrud River that were used to irrigate farms and fields before the Safavid era, and with the expansion of the Safavid city, they formed water streams within the city (Ahari, 2001). In general, 154 streams or Madis are separated from the river in order to irrigate the fields. Of these, ten materials pass through the city of Esfahan, through neighborhoods and urban elements (Jamshidi & Ghleenoei, 2011). Apart from their initial function, which was to supply water to farms and neighborhoods, with the expansion of the city, these Madis gradually found functions such as micro-climate adjustment in the heart of neighborhoods. They formed a network of continuous green axes in the city, which have historically been considered a platform for forming connections, interactions and social relations of residents in neighborhoods. In recent years, the crisis of the drying up of the Zayandehrud River and, consequently, the Madis droughts have put severe pressure on the city (Amirzadeh, 2018).

The results of environmental studies showed that the night, day, and day and night temperatures of Iran have increased by about three, one and two °C per hundred years. In the highlands, the increase in average temperature, especially in early spring, late autumn and winter, causes early melting of snow in the region and due to reduced rainfall in mountainous areas causes many problems in water storage. In general, increasing day and night temperatures along with decreasing rainfall can have detrimental effects such as reducing snowfall and premature melting, which causes more evapotranspiration and affects the water needs of plants (Saboohi et al., 2019). Therefore, an increase in winter temperatures will lead to a decrease in snow storage in the western parts of the watershed, and in the future, we should expect more water shortage problems than now. Therefore, the need to pay more attention to the management of water resources in the Zayandehrud watershed based on climate scenarios in the future should be on the agenda of managers and researchers (Saboohi et al., 2019).

2. Research Method

In this article, data collection is based on simple review of documents related to climate change and specific tools called CRPT by UN-Habitat. The content of the documents has been examined by thematic analysis method. Themes obtained from the study of documents on climate change due to CRPT include its goals, process, approaches, and tools.

3. Literature review

3.1 What is CRPT?

For the past 40 years, UN-Habitat has been working on the improvement of the future of urban life for people all over the world. UN-Habitat's mission has adapted over time to meet the needs of our growing urban world. At a time when urban planning and management are more important than ever, UN-Habitat's mission is to promote sustainable social, economic, and environmental development of human settlements and to provide proper shelter for all (UN-Habitat, 2017).

The UN-Habitat Resilience Project's main goal is to support local governments and stakeholders to make urban areas safer and better places to live and to improve their capacity to recover quickly from all possible shocks or pressures that will lead them to sustainability. UN-Habitat's understanding of a resilient city is that it is able to absorb, adapt and recover from the shocks and pressures that are likely to occur, and transforms itself positively towards sustainability (UN-Habitat, 2017).

The UN-Habitat Urban Sustainability Project was launched in 2012 under the City Resilience Profile Program (CRPP). The project provided national and local governments with appropriate tools to assess and improve the resilience of cities to a number of risk factors, including those related to climate change (Khazai et al., 2015).

In the following years, the scope of CRPP activity expanded and provided wider services to cities and developed a new range of activities. In 2016, an urban resilience program pillar was launched across the agency (UN-Habitat, 2017). Using the Hyogo Development Framework (post-2015) and recognizing resilience and sustainability as two complementary models of urban development, the program went beyond "conventional risk reduction" approaches.

The program approaches human housing from various dimensions, including spatial, physical, functional, and organizational (Gawler & Tiwari, 2014). In this view, urban resilience becomes the focal point between risk reduction and sustainability, as well as the link between humanitarian activities and development that reflects climate performance. According to UN Secretary-General António Guterres, "Saving lives is a top priority, but we are also seeking long-term resilience to shocks (IFRC, 2014).

The UN-Habitat Urban Sustainability Program covers three main areas: knowledge, support, and technical cooperation. These three main parts are strengthened by understanding the

current situation, applied research, education, and awareness-raising. The City Resilience Profiling Program (CRPP) is part of the UN-Habitat Urban Resilience Program Technical Cooperation and engages with all local partners and stakeholders. Along the way, the United Nations (UN-Habitat, 2017) developed the City Resilience Profiling Tool (CRPT) to provide a robust and comprehensive way for cities to create resilience (Barkham et al., 2013).

With the participation of all stakeholders in the resilience process, cities have the ability to curb transformational change and improve the lives of their citizens. This has been recognized by the international community through agreements such as the New Urban Agenda, the Paris Agreement, the Sustainable Development Goals, and the Sendai Framework, but in almost all areas, cities lack the capacity to operate these cases alone. The most important feature of CRPT is that it has made it possible to operate (Barkham et al., 2013).

CRPT is a very useful tool in the face of climate change because climate change should be analyzed in an evidence-based way. CRPT makes this possible because it is a comprehensive approach to climate measures. It combines climate-related risks through a holistic analysis of the physical, organizational, functional, and social environment (UN-Habitat, 2017).

3.2 UN-Habitat City Resilience Project (CRPP) and (CRPT) Tool

To be effective in its efforts, UN-Habitat organizes URP projects and activities into three main areas: 1) technical cooperation, 2) support and 3) knowledge (UN-Habitat, 2017)

The technical cooperation provided by the URP to local and national governments in different regions is the City Resilience Profiling Program (CRPP), which covers a wide range of activities:

1. Development and implementation of diagnostic and strategic planning tools
2. Credibility and monitoring of results and projects
3. Identifying resilience financing opportunities
4. CRPP is another cornerstone of the City Resilience Profiling Tool

CRPT is a multidisciplinary and forward-looking diagnostic tool to assess and measure the resilience of urban systems and awareness of the preparation of a Resilience Action Plan (RAP). This tool is intended to be used by mayors, urban planners and other staff responsible for urban development (Foundation & Arup, 2015).

3.3 Main Approaches of CRPT

Examines city profiles generated by CRPT through four main approaches to the urban system:

- Spatial vulnerabilities: are examined through planning and design. Urban policy and regulations, land adjustment, urban extensions and investment incentives
- Physical vulnerabilities: Remedied by improving regulations, codes and standards. Strengthening/upgrading infrastructure and density distribution, transportation; public area
- Functional vulnerabilities: Removed through urban design. Continuity of economic and commercial services, reform of regulations, municipal revenue / finance, transportation / energy / tools / communication upgrades.
- Organizational vulnerabilities: are addressed through city regulations and legal frameworks. Strengthen stakeholder participation (public, private and civil society), Social and economic planning (UN-Habitat, 2017).

The A4R Resilience Action is a pragmatic output of CRPP, based on adaptive learning, communicated by CRPT and vice versa. This set of proposals - tailored to the local context - addresses national urban policies, laws and regulations, planning and design, local implementation mechanisms, and urban planning funding, among others. A4R provides a unique opportunity for city officials to make deliberate and informed decisions to measure, enhance and monitor the resilience of urban systems and adopt sustainable urban development strategies.

3.3.1 Comparison of CRPT tools with other tools

Over the past years, various tools and methods have been developed to assess the degree of resilience in the urban area, including geographical risk assessment and resilience platform, tools for achieving social resilience, social resilience indicators (Foundation & Arup, 2015). Resilience Matrix or some of the frameworks designed by the US National Institute of Standards and Technology (IFRC, 2014). However, none of them are widely used around the world, and all of them analyze the resilience aspects to some extent. Instead, the Urban Resilience Index (CRI), which has developed the City Resilience Profile Tool (CRPT) as urban risk and resilience index systems, has a comprehensive and multifaceted view of the urban system.

The Rockefeller Foundation and Arup have developed the CRI to assess the various factors that affect resilience in cities (Foundation & Arup, 2015). The tool was adopted at the initiative of 100 resilient cities to guide the development of urban resilience strategies that include social, economic and environmental aspects around the world (IFRC, 2014).

CRPT is applicable to any human settlement, regardless of size, culture, geography, or economy. It must produce credible and audible data to reduce ambiguity and inform decision-making, development, and management. To this end, the tool is built on a global model of the urban system called (CRPP). These are the points that distinguish CRPT tools from other tools (UM-Habitat,2017).

CRI emerges as the most comprehensive and advanced tool for assessing the resilience of urban communities at all stages, although most of its indicators relate to sustainability tensions rather than the expansion and deepening of resilience issues. In contrast, the CRPT, which represents little coverage of environmental issues, focuses primarily on determining urban profiles to evaluate urban systems rather than assessing their recoverability (IFRC, 2014).

Sustainability and resilience are complementary features needed to jointly strengthen urban development, and the Sendai and SDG frameworks are not sufficient tools to assess resilience issues in cities. In general, all three frameworks revealed numerous and prominent gaps and prevented accurate assessment of resilience in society. Given the close relationship between sustainability and resilience, creating a new framework focusing on urban areas with both in mind is crucial to cover all stages of resilience, emphasizing improvement and adaptation.

Table 8-1 CRPT tools in comparison with other tools,
(Source: Authors, retrieved and summarized from resiliencetools.net)

TOOL NAME	PARTNERS MAPPING	TYPES OF SHOCK/ STRESS MAPPING	PURPOSE MAPPING	SCALE MAPPING	TARGET USER MAPPING	DATA INPUT MAPPING	OUTPUT MAPPING
SOCIO - ECONOMIC RESILIENCE	World Bank	Economic Environmental Multi-hazards/threats Social	Action and implementation Future scenario planning Improve coordination Measurement, verification and reporting	City Municipality National	City government National/subnational governments Other stakeholders Professional municipal staff	Qualitative Quantitative	Climate change adaptation plan Climate change mitigation plan Resilience Action Plan Resilience assessment report
CITY RESILIENCE PROFILING TOOL	UN-Habitat	Multi-hazards/threats	Action and implementation Measurement, verification and reporting Understand and baseline	City	City government	Quantitative	Resilience Action Plan
DISASTER RESILIENCE	UNISDR	Built environment Economic Environmental Multi-hazards/threats Social	Measurement, verification and reporting Priorities investments Understand and baseline	City Community Municipality Subnational	City government Other stakeholders Professional municipal staff	Qualitative Quantitative	
CURB TOOL	C40 Cities Climate Leadership Group World Bank	Built environment Economic Environmental Multi-hazards/threats Social	Action and implementation Future scenario planning Improve coordination Measurement, verification and reporting Priorities investments Understand and baseline	City	Business/investors City government Other stakeholders Professional municipal staff	Qualitative Quantitative	Resilience Action Plan Resilience assessment report
QRE TOOL	UNISDR	Built environment Economic Multi-hazards/threats Social	Action and implementation Future scenario planning Measurement, verification and reporting Priorities investments Understand and baseline	City Community Municipality National Subnational	Business/investors City government National/subnational governments Other stakeholders Professional municipal staff	Qualitative	

CITY DEVELOPMENT STRATEGY	Cities Alliance	Built environment Economic Environmental Multi-hazards/threats Social	Action and implementation Future scenario planning Improve coordination Measurement, verification and reporting Priorities investments Understand and baseline	City	Business/investors City government Other stakeholders Professional municipal staff	Qualitative Quantitative	
CITY RESILIENCE PROGRAM	World Bank	Built environment Economic Environmental Multi-hazards/threats Social	Action and implementation Future scenario planning Improve coordination Measurement, verification and reporting Priorities investments Understand and baseline	City Municipality National	City government National/subnational governments Other stakeholders Professional municipal staff	Qualitative Quantitative	Climate change adaptation plan Climate change mitigation plan Resilience Action Plan Resilience assessment report
VISUALIZING DATA TO BUILD CLIMATE RESILIENCE	WRI	Built environment Environmental Multi-hazards/threats Social	Action and implementation Future scenario planning Improve coordination Measurement, verification and reporting Priorities investments Understand and baseline	City Municipality National Subnational	City government National/subnational governments Other stakeholders Professional municipal staff	Qualitative Quantitative	Climate change adaptation plan Climate change mitigation plan Resilience Action Plan Resilience assessment report
CITY RESILIENCE INDEX	100 Resilient Cities ARUP Rockefeller Foundation	Economic Environmental Social	Understand and baseline	City	City government	Qualitative	Resilience assessment report

3.4 CRPT Systemic Approach to the City

Cities are complex systems made up of separate networks and elements, such as urban infrastructure, built and natural environments, traffic flows, and social, cultural, political, and economic structures. An urban system is the result of the communication, activity, organization and interaction of these components. The main part of the UN-Habitat's City Resilience Profile Program (CRPP) is the city resilience profile tool. CRPT provides a cross-sectional path for sustainable urban development based on resilience. Following a multi-sectoral, multi-scale

approach, CRPT considers multiple shocks and pressures in the urban system. CRPT is applicable in all cities, regardless of size, culture, location, economy, or political environment (UN-Habitat, 2017).

UN-Habitat sees the urban system approach as a methodology through which a comprehensive understanding of the city can be achieved. This approach and the resulting cognition lead to an understanding of the interaction, interdependence, and integration of several parts of the city's various systems that have been exposed to shock and stress. The advantage of this model is that, even with the unique identity of each city, it can be used in any city.

3.4.1 CRPT Process

3.4.1.1 Initiation

The link between the local government and UN-Habitat (regional or national offices or the resilience office in Barcelona) is often the result of advertising campaigns or global events. UN-Habitat offers the CRPT approach to the city's key partners, both politically and technically, to start this partnership. Initiation is usually done by a formal agreement between the local government and the United Nations-Habitat. The cooperation process varies, and some agreements involve the local government with some key partners in the city or other government levels.

In some cases, where funding is provided for implementation in specific cities, an initial assessment of the city is conducted by UN-Habitat to provide initial findings and potential collaborations through the city resilience profile tool (UN-Habitat, 2017).

3.4.1.2 Training

Initial CRPT training is provided to city officials and is followed by ongoing training and support through regular conference calls. Part of the initial training is to work with the local government to identify stakeholders who should be involved in implementing the tool. In addition, UN-Habitat provides training and guidance to cities on how to access the required data. The initial training is usually done during a 3-4-day workshop in Barcelona with the toolmakers and, if possible, with the officials of cities which have or are running the tool. Connecting to cities implementing this tool provides peer support and creates a network beyond the initial implementation of CRPT (UN-Habitat, 2017).

3.4.1.3 Data collection and Diagnosis

Gathering relevant data and ensuring its traceability is a key step in creating resilience. Data collection is handled by central institutions in the city, although much of the information requires input from local government, other levels of government, and urban partners (NGOs, the private sector, etc.). City-data is entered into UN-Habitat software to create a unique resilience profile for that city. Data is collected through a set of questions. The considerations and examples found in this tool provide a greater understanding of the scope of what is being assessed. UN-Habitat team member usually travels to the city for the first 6 months for troubleshooting and presentation to provide any additional training needed.

Figure 8-1 shows the CRPT Implementation Process.

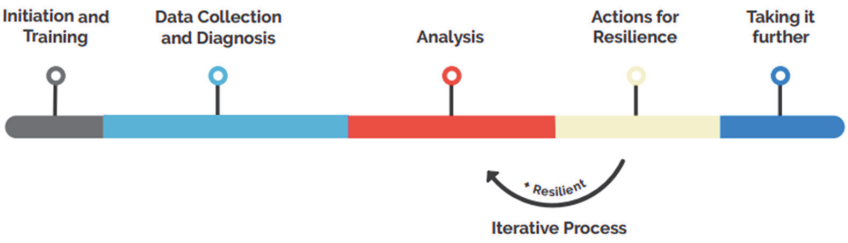

Figure 8-1 CRPT Implementation Process (Source: UN-Habitat, 2017)

Data collection is divided into four SETs that, collectively, provide an in-depth picture of the city and its stakeholders and provide the basis of the Actions for Resilience. An overview of the data sets, as well as key and cross-cutting issues, are detailed below.

3.4.1.3.1 Set 1: City ID

This set by gathering textual information on various topics that give the city its unique identity provides a general picture of the city in which the tool is run. City ID narrates the city's development through its historical background and spatial context, especially in terms of climate, ecosystems, urban areas, and physical assets. This administrative structure introduces the characteristics and strategies of the city and highlights the issues related to resilience, describes the inhabitants of the city through their composition, characteristics and dynamics, and provides basic information about the economy and livelihood.

Through SET 1, it connects its tools to the realities of the city and creates deeper questions in subsequent data sets. Background information is also used for recognition and action because it provides a basic idea of the risks and challenges it may face, including those related to climate change and humanitarian issues (UN-Habitat, 2017).

3.4.1.3.2 Set 2: Local governments and stakeholders

SET 2 provides a framework for a cross-cutting analytical approach that gathers information gathered across all urban system elements and complements Sets 1, 2 and 4. Thus, SET2 brings together all relevant information to provide an analysis of the functioning of the urban system as a whole, with a particular focus on aspects of governance. This set provides the framework for a cross-analytical approach at several levels, which is complementary to the analytical approach of sets 1, 2 and 4 of CRPT (UN-Habitat, 2017).

Set 2 considers the main tasks of local governments in developing and consolidating resilience at the city level within a broader framework of administrative and financial focus and meeting international quality standards in the area of good governance. Thus, set 2, along with Set 3 and Set 4, is an essential part of developing evidence-based recommendations for A4R. (UN-Habitat, 2017).

3.4.1.3.3 Set 3: Shock, stress, and challenges

This collection evaluates the characteristics of the city in relation to future stresses, shocks and challenges, as well as the performance of risk reduction measures and strategies in order to reduce the potential effects of those threats on an urban scale. Stress is defined as chronic pressures which cumulative effects undermine the city's capacity for resilience and is divided into two categories: internal stress and external stress. Internal stresses are chronic or persistent pressures within the urban system, including processes resulting from defects, inadequacies, or inefficiencies. Their effects make the city vulnerable, thus weakening its capacity for resilience. Unemployment could be an example.

External stress like drought is constant or chronic stress that occurs inside or outside the urban spatial boundaries. The causes of these events have no direct connection with various urban systems, including existing processes in the city. However, their effects make the city vulnerable, thus weakening its capacity for resilience.

Complex stress is chronic stress caused by different combinations of the cumulative effects of internal stresses with external stresses. An example could be coastal erosion (a combination of sea-level rise or wave measures with unplanned constructions along the coast). Shocks, on the

other hand, are known as sudden events that lead to negative effects within hours or days in urban areas. According to these analyzes, SET3, along with SET2 and SET4, are an essential part of developing evidence-based recommendations for resilience measures (UN-Habitat, 2017).

3.4.1.3.4 Set 4: Urban elements

The fourth set includes all the elements that make up an urban space, from a closed environment to a larger ecological scale, supply chain, basic and vehicle infrastructure, living facilities, public services, as well as aspects of the local economy.

This set provides a thorough understanding of the strengths and weaknesses of the urban system and evidence for future resilience decisions. Thus, SET4, along with SET2 and SET3, are an essential part of developing appropriate evidence-based recommendations for A4R (UN-Habitat, 2017).

3.4.2 Climate change measures by CRPT tool

The impact of climate change must be analyzed in an evidence-based manner. This approach is a subset of the city's resilience profile tool and is used to analyze climate change. CRPT resilience analysis is comprehensive and covering the entire urban system in measuring vulnerabilities and potential risks, as well as the government. CRPT offers a holistic approach to the production of climate action, combining climate-related risks through a cross-sectional analysis of the physical, organizational, functional and social environment of the city (Khazai et al., 2015).

3.4.2.1 Knowledge of evidence-based data

Data, trends, and models can be complex tools for government and resident decision-making, especially in areas where capacity and resources are limited. The city resilience profile tool is an available method designed to support local governments and city residents to overcome this challenge (Cimellaro, Renschler, Reinhorn, & Arendt, 2016). Data collection is widespread by connecting stakeholders (change specialists, data service providers, people and city officials) around a common resilience framework. The basis of diagnosis is the exposure, sensitivity and adaptive capacity of a city (Sharifi & Murayama, 2015).

3.4.2.2 Identify the challenges of climate change in the city

CRPT analysis presents how climate change is affecting current and long-term conditions and risks. These are assessed through models that extract information about temperature, heat waves, sediment, runoff, snow/ice cover, heat stress, drought, floods, and more (UN-Habitat, 2017) The CRPT approach uses the capacity of scientists, engineers, satellite professionals, and software developers and tools that support local government to reduce global climate change scenarios at the local and regional levels. At this scale, accreditation can be sought from the local community, and challenges and actions related to climate change (ongoing and planned) can be identified.

3.4.2.3 Impact of climate change on cities

We need to analyze current and projected climate data along with effective data to assess the impact of urban systems under the biophysical impact of climate change. To plan for climate action, it is necessary to assess the city's capacity to adapt to current capabilities and its efforts in both physical elements (infrastructure, material wealth, and technology) and social/institutional elements (human capital, governance, and institutional power).

4. Case Study: Cape Town

Cape Town, the capital of South Africa, is an urban area with a population of over 4 million. Inequalities that affect climate change are as much political as they are technical and economic (IFRC, 2014). The effects of climate change manifest themselves in the form of rising sea levels, heavy (high-risk) rain and drought, storms and winds, and wildfires ("moderate" risk). The city experiences risks in the short term, but the frequency and severity of risks are increasing. (Until 2025).

Comprehensive adaptation policies and measures to reduce risks and build adaptive capacity have already begun, and the formation of Cape Town climate resilience has gradually increased over the last decade. In 2006, the City Council established the adapted vision in a document entitled the Climate Change Adaptation Framework in Cape Town, which formed the basis for the development of City Adaptation Plan of Action (CAPA). In addition, the city has conducted a comprehensive disaster risk assessment (focusing on climate change) and an assessment of sea-level rise.

Political cohesion increased awareness of climate adaptation, and strategic partnerships have been critical to local government adaptation measures. Working closely with key national agencies, civil society, research centers and universities, as well as the informal sector of the city, helps to use the knowledge, tools and capacity to identify hazards and vulnerabilities and to design and anticipate appropriate action. The city's adaptation planning also focuses on understanding the economic and social impacts of climate change and predicts that such a trend could be turned into an opportunity for sustainable development due to the local government reconsiders its approach to poverty, inequality, and the informal sector.

However, while climate risks continue to rise, the city lacks the resources to continue adaptation research, adaptation planning, and scale measures. Another limiting factor is maintaining the institutional knowledge of the system in the face of frequent staff turnover and investing in capacity building because this "soft" compatibility measure is rarely provided by foreign financial partners.

4.1 Proposed resilience measures for Cape Town with CRPT tool

In response to increasing climate risks, local and regional governments are working to address climate risks through integrated adaptation programs that target vulnerable communities and sectors.

162 units report that they have completed or are implementing their Climate Adaptation Program ("Climate Change Adaptation / Resilience Programs" and "Integrated Climate Programs"). A total of 2,046 "Adaptation Measures" ("Adaptation Measures" and "Adaptation Measures with a Secondary Focus on Development / Emission Reduction") have been reported. Of the “Adaptation Measures ", 73% are currently "launching" or "in operation", while 24% are "completed", and only 3% are in the "planning stage" (to the meaning of attracting funds for implementation) (Barkham et al., 2013).

However, to show the totality of the work done, it is necessary to pay attention to the data that shows the current source of funding for climate adaptation measures. Pay attention to the statistics at the bottom of the page. Combined data reflect the status quo, whereby more than half of "adaptation measures" are funded or expected to be funded by the local budget. Budget resources for resilience projects: 70% local, 17% national, 8% public-private partnership, 4% international (ODA) and 1% others (Barkham et al., 2013).

5. Discussion and Conclusion: Comparison of Esfahan and Cape Town

Esfahan is the second most important city in Iran, with a population of more than 5 million people. The recurring pattern in both cities seems to have been the impact of climate change on increasing technological, economic, and political inequalities. Of course, drought, wind, and storms contain the dust of common stresses in both cities. In both cities, shocks occur in short periods throughout the year, but the worrying point is that their intensity and frequency are increasing. There are similarities in the ruling system of both cities. In both, the central government and the local government are the decision-makers, while most of the budget (70%) must come from local sources. Informing the local people and inviting them to participate highlights the importance of ruling rather than governing. The economic crisis and the resulting poverty are observed in both cities, but the roots and factors affecting them are different, and since this tool analyzes each city on its own, it can also help to cope with this shock.

To present a resilience planning model, the first step is complete and comprehensive knowledge. This is made possible by the CRPT tool, and in the stage of recognizing and producing city profiles, it examines the city in larger dimensions than other tools. Establishing communication between the city of Esfahan and the UN provides a chance for the city to be able to use this tool. Urban resilience should be measured, and basic steps should be taken in the global resilience program and other cities in order to increase and improve resilience.

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