The SymbioCity Approach

A CONCEPTUAL FRAMEWORK FOR SUSTAINABLE URBAN DEVELOPMENT

SymbioCity
SUSTAINABILITY BY SWEDEN

EDITORIAL NOTES

The SymbioCity Approach is a Swedish Government initiative promoting sustainable urbanisation worldwide, informed by Swedish knowledge and innovation, and with a significant local governance perspective. Since 2012, the Swedish Association of Local Authorities and Regions (SALAR), through SALAR International, has functioned as the secretariat for the SymbioCity Approach and its global application. The Approach has also been used by other Swedish actors in various contexts and for different purposes. For the 1st Edition, contributions were made by a wide range of experts within the field of sustainable urban development via workshops and seminars. The SymbioCity Approach is based on »The Sustainable City Aproach – Sida Manual for Support to Environmentally Sustainable Urban Development in Developing Countries« (2007), published by Sida INEC Urban, as well as on earlier versions of the SymbioCity Approach.

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PREFACE

Urbanisation continues to reshape societies at a pace few could have imagined a generation ago. Today, cities are home to roughly 58% of the world's 8.2 billion people, and two thirds of global population growth between now and 2050 will take place in urban areas. This growth is not confined to mega-cities – small and medium-sized cities already accommodate more than a third of humanity and are among the fastest growing urban centres, particularly in Africa and Asia. As a result, the social, environmental, and governance challenges linked to this development are becoming increasingly urgent. Holistic, integrated, and inclusive governance and planning are needed for urbanisation to drive transformative change and improve living conditions for all.

Climate change remains one of the most pressing challenges of our time, with global and local long-term impacts placing additional pressure on urban areas, including environmental degradation, economic instability, and humanitarian crises. Both climate change and migration have direct and often immediate effects at the local level. When well-planned, governed and financed, however, cities and towns can better meet these challenges and serve as engines of political, economic, and cultural development, providing dynamic local economies, high-quality public spaces, new digital technologies, and cost-effective services.

The *SymbioCity Approach* was developed to support sustainable urbanisation that enhances quality of life for all urban residents. It builds on the long-standing experience of Swedish municipalities in sustainable urban development, combined with best practices from SALAR International's work in developing and transition countries. *SymbioCity* has served as a platform for combining knowledge, innovation, and experiences from Sweden and globally. We continue to build this platform through a growing network of committed urban leaders, local government officials, civil society organisations, and citizens, adapting the approach to specific local needs.

SALAR International's work over the past 15 years with inclusive and sustainable urban development – and its long-standing support to decentralisation and local governance – shows that when people are given the tools, trust, and opportunities to shape their own environments, they create solutions that last. The new land-

scape of financing for development creates both opportunities and challenges for cities and local governments. For global strategies and investment frameworks to succeed, however, local ownership and inclusive processes are essential. Empowering actors at the local level is key to fostering inclusion, resilience, and innovation.

SymbioCity offers methods, processes, and tools that support efforts to develop holistic and integrated strategies that improve urban environments and living conditions. This publication does not claim to offer solutions to every challenge – those solutions lie with local elected representatives and their communities. But we hope it will serve as an inspiring and valuable resource in your urban development efforts, and we look forward to continued learning from your experiences and successes.

Ryan Knox
Managing Director
SALAR International

CONTENTS

The SymbioCity Approach – two decades of global impact

The *SymbioCity Approach* has for almost two decades been applied in various contexts globally, demonstrating the importance of fostering sustainable and inclusive urban development locally.

Key take aways and lessons learnt reinforce the importance of:

- **Holistic and inclusive planning** – where integrated solutions are reached by connecting sectors, engaging communities, and addressing economic, environmental, sociocultural, and spatial dimensions to urban development.
- **Local adaptation** – with the understanding that every situation is unique requiring a flexible and adaptable approach to local needs, resources, and contexts, ensuring relevance and ownership by local governments, communities and other stakeholders.
- **Participatory and community driven processes** – where the engagement of communities, civil society, and private sector is crucial for local ownership and in creating solutions that address diverse needs, particularly for women, children, and the urban poor.
- **Capacity building** – that strengthens the capacities and skills of institutions and urban actors enabling application of new methods and tools for sustainable and resilient urban planning.
- **Tangible improvements** – where cities have implemented projects such as sustainable mobility strategies, solid waste management systems, and public space transformations, leading to improved urban environments and living conditions.
- **Knowledge sharing** – where mutual learning and exchange of best practices between cities and countries, fosters collaboration and partnerships.
- **Importance of local government ownership** – where institutionalizing approaches to sustainable urban development among local governments, has demonstrated more integrated and inclusive planning processes.

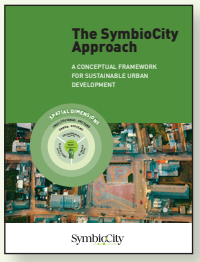
These experiences demonstrate the potential of the *SymbioCity Approach* to effectively address urban challenges and contribute to achieving the Sustainable Development Goals and the New Urban Agenda.

SALAR has facilitated the application of the *SymbioCity Approach* in over 30 countries globally, with more long term initiatives in: China (Duyun), Colombia (Apartadó and Pitalito), Ethiopia (Shashemene and Debre Berhan), Indonesia (Palu and Probolinggo), Kenya (Homa Bay, Kakamega, Kisumu, Kitui, Meru, Nakuru, and Trans Nzoia Counties), Myanmar (Dawei, Kalay and Kalaw), Tunisia (Mahdia and El Mourouj) and Zambia (Mazabuka).

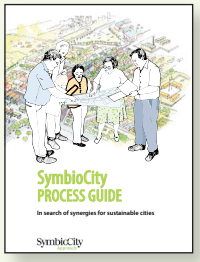
Additionally, the *SymbioCity Approach* has informed various International Training Programmes (ITPs) aiming to strengthen capacity of local governments to plan, develop and manage urban areas, covering countries such as Algeria, Bangladesh, Georgia, Jordan, Libya, Marocco, North Macedonia, Rwanda, Serbia, Syria, Tanzania, Thailand, Türkiye, Uganda, Ukraine, Vietnam, Zimbabwe.

The SymbioCity Approach has over the years generated a series of knowledge resources that are available to further explore the concept and its relevance and applicability in different contexts.

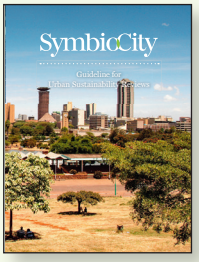
An overview, further information and resources on SymbioCity can be found under www.symbiocity.org



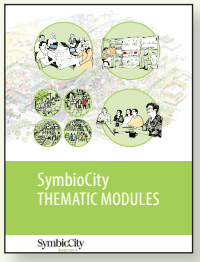
The main SymbioCity publication explains the conceptual framework with methods, tools and process-oriented support to urban development.



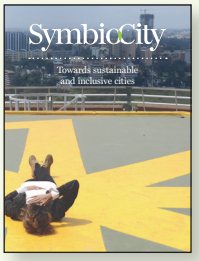
A guiding manual on the SymbioCity process which offers detailed guidelines, practical advice, methods and tools to carry out a Symbio City project.



Recommendations, instructions and templates for cities and experts that want to carry out an Urban Sustainability Review.

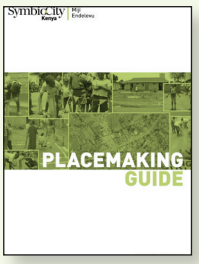


Thematic guidance on how to include gender, urban poverty reduction, participation and local economic development.



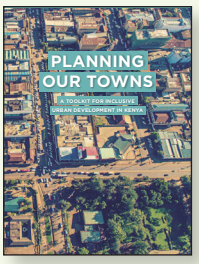
A brief explanatory brochure of Symbio City as a method and how it is used to foster inclusive and sustainable cities globally.

Provides guidance forcity leaders on facilitating sustainable urban development.

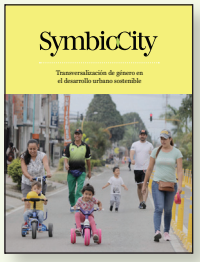


This guide for placemaking is created to guide communities in how to create good and successful public space.

An introduction to Sweden and Swedish experiences in the field of sustainable urban development, with special emphasis on local and regional government levels.

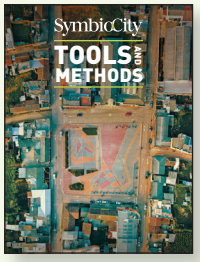


This toolkit offers guidelines for integrating an inclusive, participatory holistic perspective into urban planning and development in Kenya.

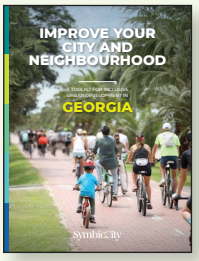


Provides methods and examples of how gender can be mainstreamed in sustainable urban development.

Summarises experiences and procide inspiration and tools for other cities wishing to embark on the journey to sustainability.



Contains a collection of methods and tools to be used in urban planning, development and management using the SymbioCity Approach.



This toolkit offers guidelines for integrating an inclusive, participatory holistic perspective into urban planning and development in Georgia.

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Structure of the publication

This publication outlines the main elements of the *SymbioCity Approach*, including its origin, conceptual framework, methodology and working procedures. The *SymbioCity Approach* is generic, and its application should be adapted to contextual needs and purpose.

- **CHAPTER 1** introduces the *SymbioCity Approach*, its origin, aim and objectives.

1. THE SymbioCity Approach

- **CHAPTER 2** provides a broad outline of key urbanisation trends and challenges.

2. URBAN CHALLENGES AS OPPORTUNITIES

- **CHAPTER 3** introduces the conceptual model as the basis for an integrated and holistic approach to sustainable urban development, and how it can be used to develop complex urban contexts.

3. A CONCEPTUAL MODEL FOR URBAN SUSTAINABILITY

- **CHAPTER 4** provides an overview of key institutional factors that are central to urban sustainability.

4. INSTITUTIONAL FACTORS

- **CHAPTER 5** provides an overview of typical urban systems and functions to consider in urban development processes, including their interrelations and the potential to identify and harness synergies.

5. SUSTAINABLE URBAN SYSTEMS AND POTENTIAL SYNERGIES

- **CHAPTER 6** suggests a generic working procedure with six main process steps, supported by a number of working methods and tools applying inclusive and transparent processes.

6. WORKING PROCEDURES

- **CHAPTER 7** introduces a number of case studies which illustrate the integrated methodology of the *SymbioCity Approach* in achieving sustainable urban development, including synergies and system solutions.

7. GOOD PRACTICE EXAMPLES

PHOTO Sixten Larsson

1.

INTRODUCING THE SymbioCity Approach

THE SymbioCity Approach URBAN SUSTAINABILITY

1.1 Background

Urbanisation is increasing at unprecedented rates, and although with regional variations, this is particularly evident in areas of Asia and Africa. Despite the significant environmental and socio-economic challenges associated with urbanisation, it is often also a positive phenomenon which can contribute to improved livelihoods, social values, ethnic and cultural integration, extension of democratic rights and poverty alleviation[1]. Holistic, integrated and inclusive governance and planning is needed for urbanisation to drive transformative change, and enhance political, cultural and economic development improving living conditions for all.

Currently some 58%, or 4,7 billion people, reside in urban areas[2]. In 2025, 1,12 billion[3] urban dwellers were estimated to live in slums or informal settlements, many with insecure tenure rights, insufficient access to water and inadequate shelter[4]. While the proportion of urban slum dwellers currently stands at an estimated 23% (2022) globally, with a slight decrease from 2020 (24.2%), the urban divide endures as the absolute number of slum dwellers continues to rise, also due to migration and climate impacts.

Barriers to sustainable urbanisation relate to e.g. constraints in public finance, the lack of political will, inadequate governance structures and capacities, and marginalisation of the poor and other vulnerable groups. Poverty is not only a lack of resources, but deprivation in terms of opportunities and choice, power and voice, and human security[5]. Unless poverty is addressed from this perspective, sustainable development cannot be achieved. At the same time, if environmental degradation and climate impacts are not reversed, this directly and indirectly leads to poverty and the violation of human rights. This collectively calls for a holistic, integrated and inclusive approach to urban planning and development informed by clear visions and goals, for example in the provision of affordable housing, basic services and environmental management. In this, cities and local governments have a central role in addressing urban challenges and defining the pathway towards a more sustainable future.

The origins of the SymbioCity Approach

Sweden's long standing tradition of sustainable urban development, including supporting this globally, has since the early 2000's been informed by the *Sustainable City concept* (2002[6]), *Support to Environmentally Sustainable Urban Development*

[1] In State of the World's Cities 2010/2011 – Bridging the Urban Divide (UN-Habitat), the implications of urbanisation are further discussed.
[2] World Bank 2024 estimates based on the United Nations Population Division's World Urbanisation Prospects.
[3] United Nations Department of Economic and Social Affairs (2025). The Sustainable Development Goals Report 2025. New York, (revision August 2025).
[4] UN-Habitat definition of urban slum dwellers, individuals residing in housing with one or more of the following conditions: inadequate drinking water; inadequate sanitation; poor structural quality/durability of housing; overcrowding; and insecurity of tenure.
[5] Sida Multi-Dimensional Poverty Analysis, June 2024.
[6] Launched at the World Summit on Sustainable Development in Johannesburg, 2002.

(Sida, 2006–2007), as well as, *Fighting Poverty in an Urban World*[7] which still has relevance in the current urbanisation context as it aims to: »promote the development of sustainable cities where all citizens have opportunities to improve their living conditions and thus can further contribute to the development of their city and country«. More recent Swedish policies include *Policy for the Climate and Environment* (2022) which targets the three planetary crisis of climate change, biodiversity loss and pollution, and, *Development Assistance for a New Era – Freedom, empowerment and sustainable growth* (MFA, 2023[8]) including thematic areas such as economic growth, health, climate action, gender and governance.

In 2008, the Swedish Government launched *SymbioCity – Sustainability by Sweden*, combining experiences from the Sustainable City concept and Swedish development cooperation, substantially building on Swedish local government experience and methods. In 2010, this became the *SymbioCity Initiative* as an overarching concept and communications platform for Swedish institutions and actors engaged in sustainable urban development. Various sustainable urban development interventions and projects in Sweden have over time underpinned this initiative, e.g. *Hammarby Sjöstad* and the *Stockholm Royal Seaport* redevelopment projects in Stockholm and the *Western Harbour* project in Malmö, all of which have won international recognition.

»The City is not a problem – it is a solution«

Jamie Lerner, former Mayor of Curitiba, Brazil

PHOTO White Arkitekter

Hammarby Sjöstad – the first generation of sustainable districts in Stockholm, Sweden.

[7] Sida (2006), Fighting Poverty in an Urban World – Support to Urban Development (policy), 2006-2011.
[8] Sweden's strategy for development assistance, Ministry of Foreign Affairs.

PHOTO AS_Photography, pixabay

The Western Harbour in Malmö – an area for sustainable living, working and knowledge generation.

»The environments that are created are designed to meet the needs of people in their everyday lives.«

Designed Living Enviroment

Against this backdrop, the *SymbioCity Approach* is a Swedish Government initiative promoting sustainable urbanisation worldwide, informed by Swedish knowledge and innovation, and with a significant local governance perspective. Upon its inauguration, it brought together various ministries and agencies at the time, e.g. the Ministries for Environment, Foreign Affairs, Enterprise, Energy and Communications, the Swedish Trade Council, Sida, SALAR and Swedish Universities. Since 2012, the *Swedish Association of Local Authorities and Regions* (SALAR), through SALAR International, has functioned as the secretariat for the *SymbioCity Approach* and its global application.

Further, in 2018 the Swedish Government established the *Council for Sustainable Cities*[9], gathering 14 national agencies and institutions to spearhead a collective effort towards sustainable urban development in Sweden. A national architecture and urban development policy – *Designed Living Environment* – was adopted in 2018, which, coupled with the establishment of a national architect, aimed to support integrated efforts towards sustainable urbanisation. This, together with Sweden's commitment to *Agenda 2030* and the *Sustainable Development Goals* as well as local experiences from *Sweden's 290 municipalities* provides a solid base for Sweden to continue supporting sustainable urbanisation in an international context. The *SymbioCity Approach* provides a key framework in this regard.

Core elements and the application of SymbioCity

The *SymbioCity Approach* integrates environmental, socio-cultural, economic and spatial dimensions to development, as

[9] https://www.hallbarstad.se/radet-for-levande-stader/.

well as, institutional, gender and pro-poor perspectives. Hereby, the *Approach* contributes to enhanced social and economic inclusion, spatial integration and environmental improvements of urban areas, as well as, efficient use of resources, climate action and alleviation of poverty.

For almost two decades, the *SymbioCity Approach* has been applied in various contexts, engaging stakeholders in the development of visionary, integrated and viable environmental, socio-cultural and economic solutions in response to urban challenges. The Approach serves as an entry point and inspiration for developing *visions, scenarios, strategies* and *transformative solutions* targeting sustainable urban development primarily in developing and transition countries. The experience from the *SymbioCity Approach* includes *urban sustainability reviews, urban planning initiatives, the development of transformative urban projects* and *training programmes*. The Approach has also been used by other Swedish actors such as Sweco, RISE, and ICLD in various contexts and for different purposes.

Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs.

In addition to the conceptual framework (»the theory«), the *SymbioCity Approach* offers a diverse set of methods and tools (»the practice«) to support the progressive transformation of urban areas towards sustainability and improved quality of life, but also in situations of urban recovery and reconstruction processes after conflict or natural disasters. The Approach promotes inclusive development processes and cooperation among stakeholders, including municipalities, regional and national governments, various institutions and universities, civil society organisations, communities and the private sector. The main owners or drivers of sustainable urban development are local governments. However, coordination and collaboration, both vertical and horizontal, with all other relevant stakeholders is imperative. Having said this, the *SymbioCity Approach* can also help guide bottom-up approaches to urban development driven by civil society organisations or community groups.

Among the most important stakeholders are the urban dwellers and the *Approach* directs particular attention to the conditions and needs of the urban poor, vulnerable and marginalised groups such as women and children, indigenous people and migrants, to ensure inclusive and transformational processes and opportunities for everyone to engage on matters that affect their lives.

1.2 Global policy framework for sustainable urban development

Addressing sustainable urbanisation is critical for the future of mankind. Cities have by some been called »the most complex phenomena ever created by humans« through their intertwined urban systems affecting and reacting with each other, their

spatial dimensions and social realities. From this perspective, the framing of sustainable development from the 1987 Brundtland Report[10] is still relevant.

Rapid urbanisation and its environmental and social implications were identified as early as the first *Conference on the Environment* in Stockholm in 1972. This initiated a UN-led process to address environmental challenges globally. The following *Conference on the Environment* in Rio in 1992 resulted in the *Rio Declaration and Agenda 21* – a global commitment for sustainable ecological, economic and social development. The *United Nations Commission on Sustainable Development* was established with the purpose to manage the process and monitor progress. Local *Agenda 21* (LA 21) became a local government component, for pursuing local strategies, plans and action including urban development. The *Millenium Declaration* was established in 2000, later condensed into eight *Millenium Development Goals* to be met by 2015. In parallel, the outcome from the *World Summit on Sustainable Development* (WSSD), held in 2002 in Johannesburg, South Africa, highlighted the importance of promoting sustainable urban development.

The *Kyoto Protocol* was adopted in 1997 (entered into force in 2005), under The *United Nations Framework Convention on Climate Change* (UNFCCC) for the reduction of *greenhouse gas emissions* among industrialized countries. It was later succeeded by the *Paris Agreement* (adopted in 2015) under the *UN Climate Change Conference* (COP 21) in Paris, with the goal to limit the global temperature increase to 1,5°C above pre-industrial levels. *The Intergovernmental Panel on Climate* Change (IPCC) indicates that »crossing the 1,5°C threshold risks unleashing far more severe climate change impacts, including more frequent and severe droughts, heatwaves and rainfall«. The Paris Agreement runs on five-year cycles, countries commit to *Nationally Determined Contributions* (NDCs, national climate plans) outlining strategies to reduce their greenhouse gas emissions.

In September 2015, the United Nations adopted »Transforming our world: the 2030 Agenda for Sustainable Development« as an action plan targeting *people, planet, prosperity, peace and partnership*. The plan is accompanied by 17 *Sustainable Development Goals* (SDGs) which are integrated and indivisible across the three dimensions of sustainable development: *economic, social and environmental*. Review and monitoring of implementation progress is managed by the *High-Level Political Forum on Sustainable Development* (HPLF), supported by countries and cities to monitor and document their own performance through *Voluntary National Reviews* (VNRs) and Voluntary Local Reviews (VLRs). The *Decade of Action* was established in 2020 to accelerate efforts to achieve the SDGs by 2030.

[10] WECD (World Commission on Environment and Development (1987) Our common future, Brundtland Commission, Oxford University Press. Oxford. p. 8.

Supporting agreements were adopted in 2015, including the *Sendai Framework for Disaster Risk Reduction* 2015–2030, with the goal to »substantially reduce disaster risk and losses«, while the *Addis Ababa Action Agenda* (AAAA) provides a global framework to stimulate financing of sustainable development and implementation of the Sustainable Development Goals.

The *New Urban Agenda* (NUA) was adopted in Quito, Ecuador in 2016 during the third conference on *Housing and Sustainable Urban Development (Habitat III)* and represents a shared vision for a better and more sustainable future. The NUA proclaims that »If well-planned and well-managed, urbanisation can be a powerful tool for sustainable development for both developing and developed countries«. UN-Habitat later released a draft *Action Framework* and the *New Urban Agenda Illustrated*[11] to support implementation of the New Urban Agenda.

To address rapid urbanisation and its impact on communities, cities, economies, climate change and policies, as well as to support implementation of the SDGs, UN-Habitat convenes the World Urban Forum on biannual basis. The conference brings together representatives and decision-makers of national, regional and local governments, civil society, academia, private sector, community leaders and professionals within the urban and built environment, to raise awareness, share knowledge and best practices, inform policy development and to promote collaboration and cooperation to advance and accelerate efforts towards sustainable urbanisation.

The Stockholm *+50 conference* (May 2022) was organized under the theme »a healthy planet for the prosperity of all – our responsibility, our opportunity« particularly addressing the triple planetary crisis of climate change, pollution and waste, and finally, nature and biodiversity loss. The IFCCC organizes every year the *Conference of the Parties* (COP), as a mechanism to follow up on progress and set new targets with regards to meeting the climate commitments, and where sustainable urbanisation is increasingly important.

»The New Urban Agenda gives clear guidance on how well-planned and well-managed urbanization can be a transformative force to accelerate towards the Sustainable Development Goals.«

New Urban Agenda Illustrated

1.3 The SymbioCity Approach – its purpose and scope

The *SymbioCity Approach* promotes a *holistic, visionary* and *inclusive* approach to sustainable urban development, integrating *environmental, socio-cultural, economic* and *spatial dimensions*, as well as, institutional, gender and pro-poor perspectives. Hereby, the Approach supports development of healthier and more sustainable cities for all.

[11] The New Urban Agenda Illustrated, UN-Habitat, 2020.

KEY FACTS

Through a holistic, integrated and inclusive approach to sustainable urban development, the SymbioCity Approach ultimately aims to improve the health, well-being and quality of life for all, by ensuring an equitable economic, social and environmental development also contributing to alleviating poverty.

The SymbioCity Approach is generic and should be applied in a flexible way responding to the specific conditions and needs of the local context, primarily in low- and middle-income countries as well as in contexts of recovery and reconstruction. However, the Approach is relevant for cities and towns also in emerging and more developed economies.

Sustainable urban development is dynamic, complex and influenced by prevailing political, administrative, economic, social and cultural environments. The *SymbioCity Approach* is a generic *conceptual framework* supported by a flexible methodology and set of tools to guide sustainable urban development processes with particular emphasis on the interfaces and synergies between urban systems and functions. To arrive at transformative solutions, application of the Approach should be contextualized to respond to the prevailing needs and specific conditions of regions, cities, towns and communities in urban areas.

The SymbioCity Approach intends to cooperate rather than compete with others with common interests and objectives.

The main objectives of the *SymbioCity Approach* are to:

- contribute to *strengthened institutional and technical capacities* of urban stakeholders and different levels of government, primarily at the local level;
- support *urban leadership and decision-making;*
- serve as a *basis for dialogue, cooperation and the mutual sharing of knowledge and experiences* between stakeholders and peers;
- contribute to the *development of city-wide strategies, plans and urban interventions* (projects) for short, medium, and long-term transformation of urban areas, including urban recovery and reconstruction in conflict or post-conflict contexts;
- serve as guidance for *Urban Sustainability Reviews* in identifying and mapping existing and emerging urban challenges;
- support cities and towns in identifying *practical and integrated systems solutions* for sustainable urban development;
- support local governments to *identify and develop projects* that are resilient, inclusive and catalytic in nature, with the aim of stimulating short-term needs and long-term local development.

The *SymbioCity Approach* acknowledges the vast range of readily available resources on sustainable urbanisation globally. Here it intends to complement such normative products, methodologies and tools in the field, and support existing regulatory frameworks, policies, strategies and guidelines. The framework does not claim to fully cover or go into depth on every aspect related to urban sustainability. It should rather be used as an entry point and be adapted when applied in specific contexts or situations.

The *SymbioCity Approach* promotes an inclusive and pro-poor approach to urban development, where the conditions, needs and rights of disadvantaged and vulnerable groups are taken into account, and that they are included in the process. This is particularly important when communities, groups or individuals such as the urban poor and other vulnerable groups (including but not limited to women, children, older persons, people with disabilities, indigenous peoples, migrants, slum dwellers, and displaced population groups), lack adequate representation and are not involved in plans and decisions that affect them. Good urban governance promoting inclusion and participation is critical in this regard.

The *SymbioCity Approach* primarily addresses sustainable urban development at the local level, empowering local authorities and their decision-makers, i.e. both elected representatives and officials (civil servants) in local councils and municipal departments, but also other urban stakeholders such as civil society organisations, community groups, professional associations, businesses etc. Regional and national governments are equally important to engage on issues affecting development on local level.
It should be highlighted that an underlying assumption of the *SymbioCity Approach* is the need for a certain degree of local autonomy of a city or town in terms of decision-making mandates, planning, allocation of resources, and democratic legitimacy among inhabitants – in order to truly work holistically, integrated and inclusive.

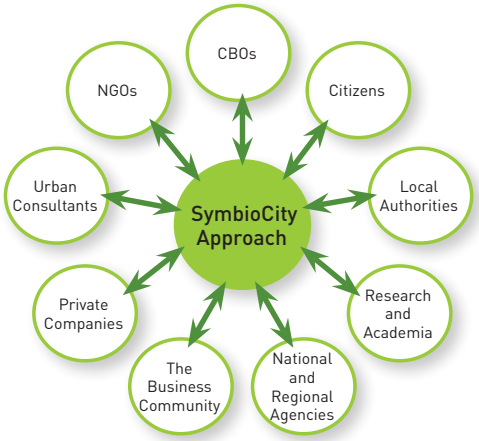


Figure 1.1
Involvement of different stakeholders is crucial in the implementation of the SymbioCity Approach.

1.4 The SymbioCity Approach as a method

The *SymbioCity Approach* is a framework building upon a conceptual model that provides the theoretical foundation for all *SymbioCity initiatives*, while the methodology is informed by an iterative and practical working process with supporting tools. Hence, the *SymbioCity Approach* can inspire general discussions and understanding of urban sustainability including economic, social and environmental perspectives, and what it means in certain contexts. Further, it offers practical guidance that ideally results in tangible and actionable development outcomes to advance urban sustainability. Raising awareness and strengthening capacities among urban actors cuts across these perspectives.
By adhering to the principles of *planning for people, planning*

with people and adopting *integrated approaches* to planning and development, the *SymbioCity Approach* applies a human-centric lens to improving living standards, safety, comfort and quality of life for all. The three principles are interlinked and built upon active participation, consultation and awareness raising, engaging a wide range of stakeholders and communities.

PHOTO Hoperaisers Initiative

The SymbioCity approach recognises the needs of different groups, for example women, girls and boys.

KEY FACTS

PLANNING FOR PEOPLE: People have different needs and priorities – the elderly, children, women, people living with disabilities, and people of different income and education levels, all use spaces and services differently. An inclusive urban area is one where services, spaces and solutions have been adapted to meet the needs of the entire urban population.

PLANNING WITH PEOPLE: Urban areas that are inclusive develop from a participatory process, where all stakeholders, particularly those from vulnerable sectors of the community, are included in the planning, development and management. Hereby, solutions can be found that respond to the needs of different groups and build a sense of ownership among stakeholders.

INTEGRATED PLANNING: Integrated planning looks beyond an individual's perspective only, to include a broad range of stakeholders, sectors, and solutions. It means viewing urban areas from a holistic perspective, working across borders, and leveraging the joint resources of all urban stakeholders to move in a sustainable direction.

Urban development is in many instances the responsibility of local authorities, and the *SymbioCity Approach* promotes an inclusive approach to development where various urban stakeholders are involved in the process, for example representatives of communities, organisations and civil society, the business and private sector. At the same time, the outcomes from urban develop-ment initiatives also need to be inclusive, implying equitable access to urban spaces and functions, and in ensuring that pro-poor perspectives, gender equality and the needs of vulnerable and marginalized groups are met.

»By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.«

Target 11.3 of SDG Goal 11

KEY FACTS

The SymbioCity Approach follows a set of foundational entry points that frame the process and working methods in an inclusive and sustainable direction:

FROM SILOS TO MULTIDISCIPLINARY TEAMS – connections between different actors and disciplines lead to synergies and integrated solutions, which make better use of local resources and assets.

FROM TOP-DOWN TO BOTTOM-UP PROCESSES – empowering and engaging people and stakeholders promotes well-adapted and long-lasting urban solu-tions that work for everyone.

FROM PROBLEM-BASED TO VISION-BASED – a positive, shared vision of the future motivates stakeholders to look with courage and hope at the many and difficult problems they often face.

FROM REACTIVE TO PROACTIVE – instead of react-ing to problems as they emerge, a proactive ap-proach to urban challenges can save money and avoid disasters.

FROM SINGLE EFFECTS TO SYNERGIES – synergistic solutions that solve several problems at the same time are often more cost-effective and sustainable, yielding more from less.

Urban systems and functions are integral to existing and desired spatial and functional features of a region, city, town, or area, where the *SymbioCity Approach* promotes equitable environ-mental, economic and sociocultural development that aims to en-sure health, safety, comfort and quality of life for all. Harnessing the synergies in the relations between urban systems, functions and structures, in sectors such as water, energy, waste, transport and traffic, buildings and architecture, information technology,

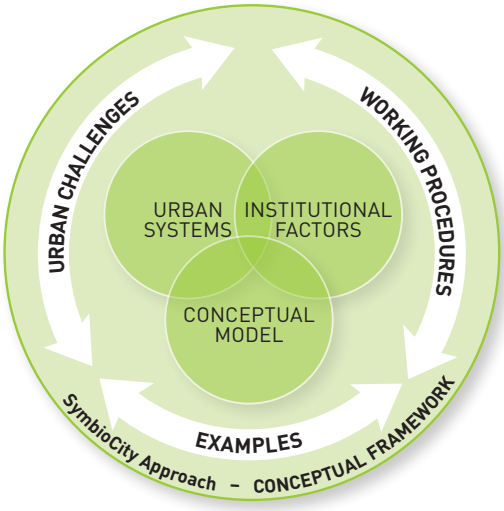


Figure 1.2
The SymbioCity Approach can be used as a conceptual framework and guide for sustainable urban development processes.

landscaping and social spaces, can lead to more effective and targeted solutions bringing added value.

An effective and transparent *institutional framework* is essential for making urban development processes and outcomes sustainable. Institutional factors include management, distribution of responsibilities, and internal and external linkages, but also legislation, financing, urban governance and political leadership. For example, spatial and urban planning mandates are part of the institutional framework.

The *spatial organization* of cities and towns, incling the provision and distribution (location) of various urban functions and systems, inform conditions towards urban sustainability. Urban sustainability mitigates spatial inequalities, and ensures equitable access and proximity to e.g. social services and economic activities. Spatially inclusive urban areas concern the urban and regional built and natural environment, meaning that urban development needs to consider multiple urban levels and scales from territorial and city-wide to neighbourhood and block level.

Against this backdrop, the entry points, foundational values, and components of the *SymbioCity Approach* are framed as a conceptual framework.

The working procedures offer a six-step iterative process accompanied by a set of tools that can be adapted to the prevailing conditions, the specific needs, and applied at various urban levels – the region, the city, the city-district, the neighhourhood or the single block. The working process should however always be target-oriented, multi-disciplinary, transparent and inclusive, and preferably result in strategies or tangible action plans for implementation and follow-up. The working procedures are based on experience from applying the SymbioCity Approach in various contexts globally over the past two decades. It is also informed by research and urban development work in Sweden in collaboration with municipalities [12].

The process can be used when *formulating visions and strategies*, drafting or reviewing spatial or local physical development plans, or to support development of *specific transformative projects*. It is also useful in providing strategic orientation and assessments for sustainability, to support implementation of existing strategies or plans, and finally, to identify necessary institutional, organizational and managerial changes. Examples of when the *Symbio City Approach* can be useful include:

- *initiating and undertaking development planning processes, on different urban scales;*
- *preparing development or regeneration strategies and plans for existing cities or new towns, districts and neighbourhoods;*
- *reviewing existing plans or conducting Urban Sustainability Reviews (USR) of a specific thematic area (or sector) or for a city, town or district;*

[12] www.environ.se – Ranhagen et. al. 2000, and Sustainable Municipality – Ranhagen, 2012, as well as, the "Swedish Sustainable Municipality Project", financed by the Swedish Energy Agency.

- *initiating responses and develop long term strategies for urban recovery and reconstruction in crisis, conflict or post-conflict contexts;*
- *analysing institutional or organisational frameworks in urban contexts.*

KEY FACTS

URBAN SUSTAINABILITY REVIEWS

An Urban Sustainability Review (USR) is a proactive way of initiating dialogue on sustainable urban development among different stakeholders, typically to identify and assess issues that need to be addressed to enhance the performance and sustainability of a particular area. Sustainability aspects are systematically built into the USR process, to arrive at strategic responses and transformational urban development interventions. An USR can focus on a geographic area with or without existing development plans, e.g. a Master Plan or Integrated Development Plan.

The *SymbioCity Approach* promotes a multidisciplinary approach to urban transformation and development. However, the Approach can be applied using two possible entry points.

THE MULTIDISCIPLINARY AREA-BASED APPROACH analyses a geographic area (e.g. city, district, neighbourhood) from a number of perspectives to identify opportunities, challenges and possible synergies between different aspects in the integrated planning framework. This approach requires an open and transparent process from the outset, not least to manage possible institutional barriers or conflicting interests.

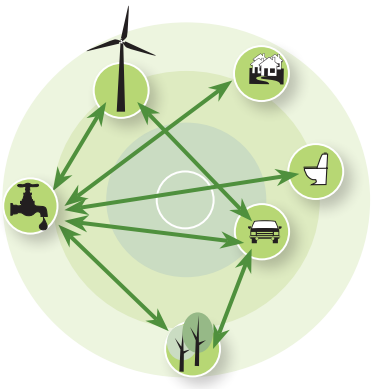


Figure 1.3
A MULTIDISCIPLINARY APPROACH – involving various sectors in an open and transparent process.

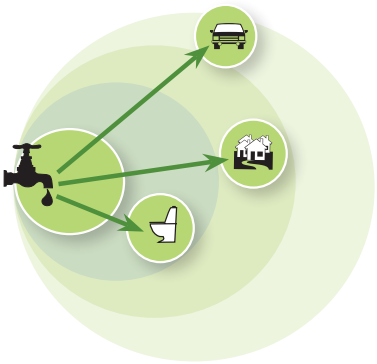


Figure 1.4
A SECTORIAL APPROACH – starting with a detailed analysis of a specific urban system.

THE SECTORAL APPROACH analyses in detail a specific urban system, e.g. water, waste or transportation. In this case, a progressive expansion of the scope of the review can identify potential synergies with related aspects and systems, as well as other opportunities and challenges. This approach is common when an existing plan is in place, or a draft proposal needs to be reviewed. A sectoral approach should preferably develop over time into a multidisciplinary approach.

1.5 Towards achievement of the SDGs

The *Sustainable Development Goals* (SDGs) and the *New Urban Agenda* (NUA) are two of several global frameworks aiming to promote sustainable development and eradicate poverty by 2030. Cities are economic generators and given the level of urbanisation as well as the relation between urbanisation and climate change, local and sub-national governments are paramount for achieving the SDGs while ensuring that development needs and aspirations of the inhabitants are met within the planetary boundaries.

Cities and local governments, in collaboration and coordination with other public, private and academic actors, are well positioned to identify systemic urban solutions in meeting the SDGs. Against this backdrop, the *SymbioCity Approach* promotes local governments in driving locally-led, holistic and visionary planning towards transformative and inclusive urban solutions for implementation of the SDGs, and in particular **SDG 11 SUSTAINABLE CITIES AND COMMUNITIES:** *Make cities and human settlements inclusive, safe, resilient & sustainable*. However, as we live in a predominantly urban world and due to the complexity of cities and urbanisation, Goal 11 cannot be looked at in isolation but rather as part of an interlinked system where many of the goals rely on each other, directly and indirectly.

These intertwined relations allows the *SymbioCity Approach* to address and contribute to poverty reduction **(SDG 1)**, gender equality **(SDG 5)**, clean water and sanitation **(SDG 6)**, affordable and clean energy **(SDG 7)**, industry, innovation and infrastructure **(SDG 9)**, reduced inequalities **(SDG 10)**, responsible consumption and productions **(SDG 12)**, climate action **(SDG 13)**, life below water **(SDG 14)** and life on land **(SDG 15)**. Further, a prerequisite in any urban planning and development process is strong local institutions that enable accountable, responsive and inclusive decision-making processes through participation of stakeholders as well as partnerships with public, private and academic actors. **SDG 16 Peace, justice and strong institutions** and **SDG 17 Partnerships for the goals** are therefore integral as institutional components in all *SymbioCity* initiatives.

SymbioCity aims to support integrated approaches to development by providing tools that move from displaying **WHAT** needs to be done to show **HOW** to move into action and achieve the goals, without compromising a strong foundation on local realities and preprequisities.

Figure 1.5
More information on the Sustainable Development Goals, their targets and indicators as well as progress made, can be found under https://sdgs.un.org/goals.

2.

URBAN CHALLENGES AS OPPORTUNITIES

URBAN GROWTH CLIMATE CHANGE RESILIENCE CHALLENGES

2.1 Urban growth trends in transitional and developing countries

The world's population is projected to increase from 8 to 9 billion between 2022 and 2037, to eventually peak at 10 billion in 2080[13]. Currently some 55% of the world's population resides in urban areas, with scenarios predicting that over 60% of the population will live in cities by 2030, and almost 70% by 2050. Although with variations between regions and countries, this urbanisation trend is especially evident in low and middle income countries, e.g. in Africa and Asia.

According to the UN , the urban population in less developed regions was around 18% in the 1950's, 50% in 2018 and projected at 66% by 2050. In high income countries, urbanisation was at 25% in the 1950's and estimated at around 80% for 2025, again with variations between countries. The annual urban growth rate in the least developed countries has over the years been around 4–5%, but with a predicted decrease towards 2030 and 2050. The absolute numbers of the urban population will however still increase.

The *Latin American region* is the most urbanised in the world just bypassing North America, with estimates for 2025 suggesting that over 82% of its population living in urban areas (*South*

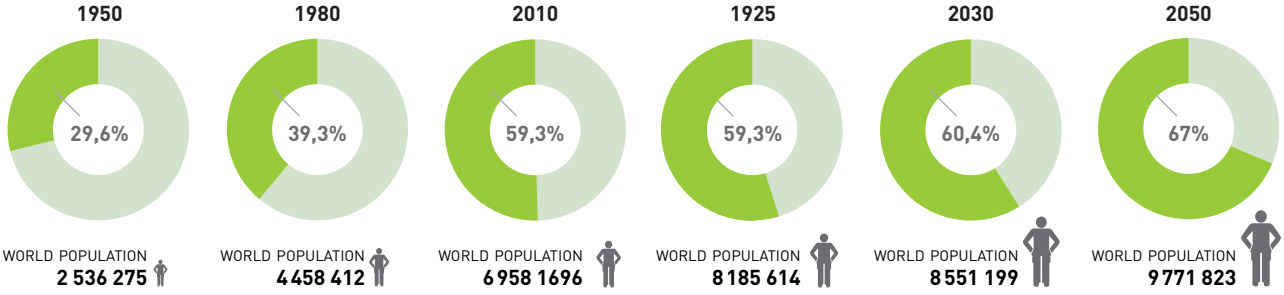


Figure 2.1
The projected world population distributed between urban and rural. By 2030 some 60% is estimated to be urban, and some 67% by 2050. = total population in millions. Source: UN statistics, 2018 revision.

[13] UN Population Fund / World Urbanisation Prospects, 2018 revision.

America 86% and Central America 77%). Urban growth rates have however declined to around 1%, significantly lower than developing countries in other regions. The metropolitan areas of Rio de Janeiro and Buenos Aires had in 2025 a population of 14 and 15,7 million residents respectively, with an annual growth rate of below 1%.

In the *Asian region*, some 54% of the population live in urban areas with an average growth rate of around 2%, again with variations between countries. In countries like Cambodia and Bangladesh the urban growth estimates are around 3%, however with a declining trend. The megacity of Dhaka (Bangladesh) had in 2025 a population of 24,7 million and is expected to grow further (currently 3% per annum). Similarly, Jakarta in Indonesia has a population of 11,5 million, however with a slightly lower expected population growth at below 2% per annum.

The *African region* is the least urbanised with some 46% of the population estimated to live in urban areas in 2025 with a predicted increase to 50% by 2030. In South Africa, some 70% of the population resides in urban areas, while only 45% in Nigeria which is the continent's most populous country. Lagos, with a population of 17,5 million, continues to grow with an annual increase of just below 4% (2025). East Africa is rapidly urbanising, currently with 30% living in urban areas. Countries like Uganda, Burundi and Ethiopia are however still predominantly rural.

While the number of megacities and their size are expected to increase, the majority of urbanisation will take place in *secondary and intermediate cities*. Each year, urban areas globally grow with some 60 million people, or 164,000 per day, due to both migration and natural population growth. A significant number is forced to informality and slums, and in 2022 some 25% of the global urban population was living in slums or informal settlements [14].

These urbanisation trends call for proactive approaches to both harness associated opportunities and to meet development needs, e.g. in the provision of housing, basic services and public space. Today, some 3 billion people globally struggle to afford a place to live, while 1,12 billion people live in slums or informal settlements without basic services [15]. Adapting to climate change, reducing risks and hazards, limiting urban sprawl and improving access to sustainable mobility options and municipal services are some aspects that urgently needs to be addressed.

Many urban areas experience such inequalities and development challenges which often are exacerbated by weak governance with low level of legitimacy or inability to deliver services. Others are chronically prone to crisis and vulnerable to various shocks and events. Such fragile contexts also contribute to rapid urbanisation.

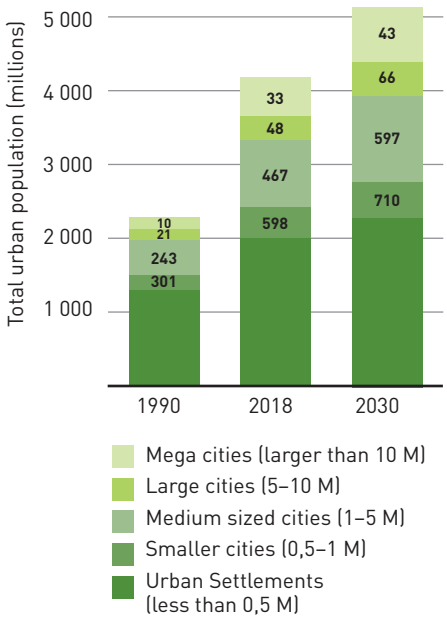


Figure 2.2
Urbanisation will predominantly take place in intermediate and secondary cities. The number in the bar chart refers to the number of cities while the height of the bar reflects the size of the population.
Source:
UN World Urbanization Prospects 2018

[14] Cities and Climate Action, World Cities Report 2024, UN-Habitat.
[15] https://unstats.un.org/sdgs/report/2025/goal-11/.

2.2 Urbanisation presents new opportunities for humankind

Urban areas will continue to grow, both naturally and through migration. Cities and towns often present better economic and other opportunities, also for disadvantaged and marginalized groups. If managed properly, urbanisation creates a dynamic environment offering options for livelihood and income, improved living conditions, sustained consumption, and social cohesion.

Cities with high population density can capitalize on economies of scale, for example in public transport, recycling of water, waste and materials, and efficient energy use. The concentration of people and activities in cities offers a diverse and intense mix of functions and possibilities. Migration to cities is usually caused by *educational, employment and livelihood* opportunities that are not available elsewhere (e.g. in rural areas), but increasingly also by *conflicts* and a *changing climate*.

Cities and towns normally present a diverse and dynamic economic and business environment, offering a wide range of *services* and *socio-cultural activities* that are accessible and of better quality, enhancing opportunities for social networks among people and groups. With technological advancements also comes an increased connectivity, not only within cities but also regionally, globally and with rural areas.

Cities are in many cases the »engines« for economic growth. According to the World Bank more than 80% of the *Gross Domestic Product* (GDP) globally is generated in cities. The share of total GDP generated in emerging economies is steadily increasing, currently above 40% according to UNCTAD[16]. If properly managed, for example through policy coordination and strategic investments, urbanisation can contribute to sustainable growth supported by innovation and increased productivity. National and local governments are key in ensuring that the gains made are fairly distributed creating opportunities for all. This requires rights-based institutions and policies that ensure inclusion, justice and redistribution of power and resources.

Generally, cities drive *political, democratic, cultural and economic development*. However, an urbanizing world needs to recognize and respect the planetary systems and establish living patterns that harmonise with the environment. Despite the many opportunities that cities and towns offer, urbanisation is closely linked to both environmental degradation and climate change. These and other challenges call for integrated approaches towards development, including technical, financial and social solutions that are viable, affordable and inclusive. Economic sustainability depends in many cases on social and environmental sustainability.

Urban areas are typically the drivers of political, democratic, cultural and economic development.

[16] United Nations Conference on Trade and Development, 2023.

2.3 Climate change

Climate change is one of the most pressing challenges of our time, with global and local impacts of increasing magnitude highly affecting urban areas. Typical impacts include more frequent and extreme weather events, resulting in damage of infrastructure, displacement and the loss of lives; rising sea levels and increased flood risks, affecting in particular coastal zones; heatwaves and air pollution, causing fires, heat island effects and health risks; threats in the provision of food and water due to unpredictability in harvests, increased water scarcity and degradation of the environment.

Main causes of climate change

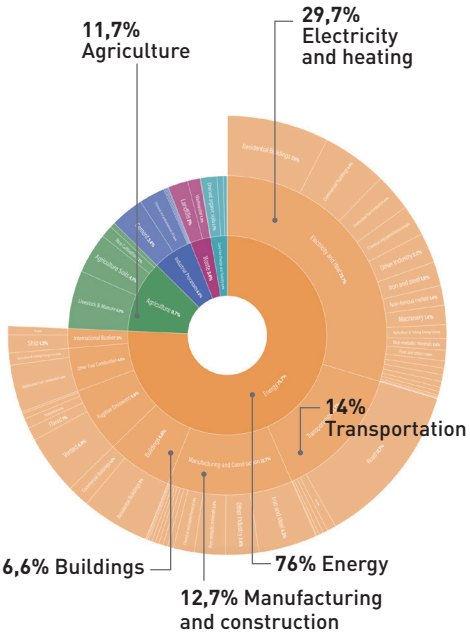
Climate change relates to global warming caused by human activities such as emission of *Green House Gases* (GHGs), burning of *fossil fuels, change of land use, deforestation and agricultural activities*, releasing e.g. carbon dioxide into the atmosphere. While urbanisation in many ways contributes to climate change, climate change is also a driver for urbanisation [17].

While developed countries historically have emitted most Green House Gas emissions, emissions from developing countries continue to increase. This is due to e.g. industrialisation and increased productivity, economic growth and consumption, transportation and use of energy (incl. fossil fuels). Currently, developing countries are responsible for the majority of global GHG emissions, however with significantly lower GHG emissions per capita [18].

Meeting the global targets

IPCC[19] argues that while some advancements have been made globally to decrease the emission of GHGs and carbon dioxide (CO_2), the average global temperature is estimated to have increased with some 1°C until 2019 (compared to average temperatures 1850-1900), and projected to increase with between 1,5°C and 4°C until 2100 depending on the rate of emissions. With current rate of global warming the target of 1,5°C is estimated to be reached between 2030 and 2052. To reverse the negative trend, the emission of greenhouse gases must be halved by 2030 and reach net-zero by 2050. Reducing GHG emissions across the full energy sector requires major transitions, including an overall substantial reduction in the use of fossil fuels, the deployment of low-emission energy sources, transitioning to alternative energy carriers and improving energy efficiency and conservation.

Under the Paris agreement countries commit to reducing greenhouse gas emissions through both adaptive and mitigative measures. This is formulated as national climate action plans or Nationally Determined Contributions (NDCs).



Figur 2.3
Global emissions of greenhouse gases by sector (%). Some 76% is related to the use of energy.
Source: World Resources Institute / Climate Watch, 2021

[17] UN Habitat, World Cities Report, 2024.
[18] IPCC, 2023: Sections. In: Climate Change 2023: Synthesis Report.
[19] IPCC, 2023: Sections. In: Climate Change 2023: Synthesis Report.

The impacts of climate change

It's estimated that between 3.3 and 3.6 billion people currently live in contexts that are highly vulnerable to climate change. The IPCC (UN-Habitat, 2024) estimated that the global mean sea level is likely to rise between 0.43 and 0.84 meters by 2100, relative to sea levels in 1986-2005. Globally, more than 850 million people reside in Low Elevation Coastal Zones (LECZs), of which approximately half are in low- and lower income countries. By 2040, some 2,000 urban centres are expected to be located in areas below five meters above sea level, which today represents some 1,4 billion people.

KEY FACTS

SETTLEMENTS IN LOW ELEVATION COASTAL ZONES

- Today, ocean and sea coasts – land that does not stretch more than 100 km inland – are home to 2.4 billion people, approximately 40% of the world's population.
- While coastal areas occupy only 20% of the global land surface, their population density is three times higher than the global average.
- 75% of the largest metropolitan areas lie in coastal areas, and the global population in low-elevation coastal zones (i.e. within 10 metres above sea level) is projected to reach 1.4 billion by 2060.
- By the end of the 21st century, sea levels are projected to rise on average between 40 cm and 75 cm, potentially exceeding 1 metre in certain regions.
- By 2100, coastal flooding risk alone is projected to affect 360 million people and generate trillions of dollars of losses every year.

Source:
OECD, Adapting to a changing climate in the management of coastal zones, 2021

PHOTO WordpressBlogg

Urban areas are increasingly exposed to the effects of climate change.

Urban areas are exposed to climate change impacts affecting health, livelihoods and key infrastructure. Urban infrastructure e.g. transportation, water, sanitation and energy systems are typically compromised by extreme weather events, causing negative effects on the economy, disruptions in service provision and negative impacts on well-being. In addition, fires and heat island effects are increasingly noticed in urban areas, adding direct risk and safety concerns. These effects often lead to significant economic societal and individual losses, in particular affecting economically and socially marginalized groups.

The impact of climate change in rural areas can also have serious consequences for urban areas, e.g. related to food security,

access to water, maintained ecological systems etc. The impact of extreme weather events in rural areas can instigate migration of 'environmental refugees' to urban areas. In dry regions water shortages will become more critical, while wet regions can expect higher rainfall. Flooding and landslides can be devastating in urban environments, especially in contexts experiencing rapid urban growth, inadequate planning, poor infrastructure and land management. Informal settlements are often extremely vulnerable in this regard.

PHOTO SamuelFJohanns, pixabay

Heavy rainfall and raising sea levels impact in particular settlements in Low Elevation Coastal Zones.

KEY FACTS

FLOODING

In 2025, over 500 millimeters of rain over two days in Durban, KwaZulu Natal Province, South Africa, claimed over 500 lives and displaced tens of thousands, while destroying homes, infrastructure and livelihoods across the province. Research shows that the intense rainfall was exacerbated by three key drivers:

- A warmer atmosphere, fuelled by greenhouse gases, holding more moisture.
- The Agulhas Current has warmed in recent decades, increasing ocean evaporation and feeding moisture into coastal storms.
- Changes in wind patterns funnelling more moist air into the region.

Source:
University of the Witwatersrand, Johannesburg, South Africa, 2025

»The world is in a climate emergency. Unless greenhouse gas emossions fall dramatically, warming could pass 2,9°C this century«

UN Environment

Responding proactively

Properly planned and managed urban areas can contribute to the reduction of emissions and advance climate resilient development. Integrating climate responsive planning and design of urban areas is critical, including e.g. *land use planning, efficient urban forms and structures, mixed land use and provision of urban functions, urban greening, access to effective and affordable mobility and transport systems, energy efficient design and use of materials in the built environment, regeneration and retrofitting.*

A holistic, integrated and inclusive approach to urban development can contribute to transformational mitigation and adaptation measures, of benefit to human health and wellbeing, including the reduction of vulnerability for the urban poor. Integrating nature-based solutions and strengthening ecosystem services in urban planning and development, e.g. through the provision of green-blue infrastructure in the urban environment, contributes to carbon uptake and storage, while also mitigating impacts from flooding and extreme weather events. This can be achieved through general greening of e.g. streets, parks and open spaces, permeability in soils and ground covers, restoring forests and wetlands, introducing solutions for permanent or temporary retention of water etc.

Climate mitigation and adaptation

Global warming and the emission of greenhouse gases are of both global and local concern, and climate action refers to two distinct but interrelated perspectives: *mitigation* and *adaptation*.

Both actions can help slow down or even reverse climate change, where adaptation is also closely linked to building resilience among communities. UN-Habitat[20] outlines the following distinction:

Mitigation relates to »any action taken by governments, businesses, or people to reduce or prevent greenhouse gas emissions, or to enhance carbon sinks that remove these gases from the atmosphere«. Reducing GHG emissions in cities can be achieved, from national to local levels, by adopting renewable energy, low-carbon or zero-carbon multimodal transport, sustainable land use, building construction and industrial processes, and models of production and consumption that are more sustainable, including behavioural and lifestyle changes. Carbon sinks can be enhanced through Nature Based Solutions – planting of trees, restoring forests, wetlands, and marshlands, maintaining soil health, and protecting terrestrial and marine ecosystems.

Adaptation to climate change, on the other hand, relates to »actions that help reduce vulnerability to the current or expected impacts of climate change like weather extremes and hazards, sea-level rise, biodiversity loss, or food and water insecurity«. To be effective, adaptation to climate change needs to occur at the

[20] Cities and Climate Action, World Cities Report 2024, UN-Habitat.

local level. Consequently, communities, cities, individuals, and a wide range of institutions, need to be empowered to play a pivotal role. A number of adaptation measures can be considered, e.g. climate-resilient infrastructure, protection against extreme weather events, early warning systems and disaster preparedness, land use and resilience planning, addressing specific needs of vulnerable groups by ensuring access to basic services, health care and other social services.

Successful adaptation outcomes often contribute to enhanced resilience, also reflecting the capacity to adapt among local actors i.e. governments, households, private sector, civil society etc. Mitigation and adaptation often require close collaboration between local and national (and international) entities due to the huge financial resources and capacities needed.

Carlsberg area in Copenhagen with new green urban spaces capable of detaining rainwater to decrease the risk of flooding and simultaneously be used for recreational activities.

2.4 Urban resilience

Urban resilience refers to the long-term capacity of cities and towns to withstand, recover from or adapt to environmental, social and economic threats and crises (natural or man-made), while continuing to change and develop – i.e. transform to gradually become more resilient. Emerging social, health and climate related stress factors, call for a strengthened resilience in urban areas, in particular in regard to ecological and social systems. The definition and understanding of resilience varies slightly between sectors, and the *SymbioCity Approach* aligns to the IPCC definition below:

KEY FACTS

RESILIENCE

»The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.«

Definition according to the International Panel on Climate Change.
Source: IPCC, 2023: Climate Change 2023: Synthesis Report

Many cities and urban settlements, especially in rapidly urbanisation contexts, are increasingly at risk and exposed to shocks and sudden events such as floods, tsunamis, earthquakes, droughts and landslides. Measures to reduce exposure, vulnerability and threats need to be integrated in spatial and urban planning to enhance resilience and to develop the capacities to absorb, adapt and transform in response to such events.

Local governments have a key responsibility in ensuring that sustainable urbanisation provides basic services and infrastructure. However they often lack a clear mandate or recognition among regional and national governments when it comes to responding to sudden events and crises. Empowering local governments with political, financial, regulatory and technical capacities is therefore essential to strengthen resilience at the local level.

Enhancing resilience includes building strong local systems in the provision of e.g. food, water, energy, economic activities and local economic development. Urban areas depend in many instances on its hinterland and ensuring the urban-rural continuum is here essential. Similarly, the global economy where cities are reliant on goods and services from other regions can increase risks and vulnerability in case distribution chains are disrupted. Striking a good balance between global, regional and local production and provision of goods and services can enhance resilience of urban areas. For example, increasing local food production in an urban area and its immediate vicinity can reduce dependence on provision from more distant regions, while also reducing the environmental impact.

Resilience can sometimes be related to the *ecological footprint* of urban areas, i.e. the productive land required to supply energy, food, water and other resources. Developed countries generally require three to five times the available land area per capita compared to the global population per capita, and emerging economies currently increase their ecological footprint. Cities and industrial regions typically depend on a vast global hinterland of ecologically functional and productive landscapes to sustain. An increased local production and generation of resources enhance resilience while reducing the ecological footprint.

Change can often be foreseen or be planned, and scenarios of development should be consciously considered in relation to potential or expected changes and risks. However, increasing uncertainty with more frequent, sudden and unexpected events causes severe impacts on both ecosystems and settlements, for example more frequent fires in and around urban areas. Resilience includes the long-term capability to manage such sudden changes and events. Spatial and urban planning needs to integrate comprehensive risk analysis to identify possible threats, including strategies and measures to mitigate risks and manage impact. Raising awareness and understanding of

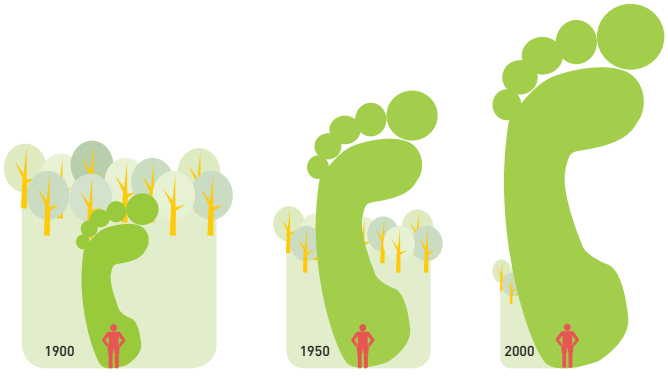


Figure 2.4
The ecological footprint – the discrepancy of the footprint in the rich world (North America and Europe) compared to the land available for the global population per capita.
Source: Wackernagel & Rees (1996); Ranhagen et al (2000)

such potential risks, among local authorities and urban stakeholders, can enhance overall preparedness and inform the introduction of response mechanisms at an early stage.

The *COVID-19* pandemic demonstrated the importance of integrating resilience in urban development planning. The pandemic significantly impacted cities and urban areas, where lockdowns and curfews brought local economies to a stand-still. Urban areas with high population density were initially perceived as the cause for transmission of the virus. However, studies have shown that the risk exposure rather related to inequality, inadequate housing, lack of access to clean water, sanitation and waste management – aspects affecting especially marginalized and vulnerable groups and that cities struggle to address also for other reasons. In the specific case of the pandemic, the transmission and impact of the virus was also influenced by the overall strategies and measures taken by governments.

Urban resilience is a key consideration for planning of regional, city-wide and local areas, and for ensuring that social, environmental and economic systems are sustained in relation to sudden shocks and events. Strengthening the resilience among local authorities and communities is critical, including crisis preparedness, management and response.

KEY FACTS

PREPARING FOR INCREASED TEMPERATURES

By 2100, extreme heatwaves will become the new normal for many cities across Europe and Central Asia. Almost 70 percent of the region's urban centers are projected to face at least one severe heatwave a year. In one third of these cities – particularly in the Western Balkans, Eastern and Southern Europe, Türkiye, the Middle East and Central Asia – extreme heatwaves are expected to strike annually, lasting up to two months and reaching peak temperatures 4°C higher than today.

Source: World Bank. 2025. Unlivable. How Cities in Europe and Central Asia Can Survive – and Thrive – in a Hotter Future

CITIES AND PANDEMICS: TOWARDS A MORE JUST, GREEN AND HEALTHY FUTURE

Following the pandemic, UN-Habitat identified four policy areas to enhance urban resilience:

Rethinking the form and function of the city: Reconfiguring urban morphologies and systems at various scales (regions, territories to neighbourhoods and buildings) to enhance resilience (also against the pandemic) while promoting sustainability and productivity. Inclusive planning should promote compact design, accessible mobility and mixed land use, also towards more safe and liveable urban environments.

Addressing systemic poverty and inequality in cities: Targeted interventions to mitigate the disproportionate COVID-19 impacts on poor and vulnerable groups through emergency assistance and services, while in parallel addressing the root causes of exclusion. Overcrowding and limited access to basic services have increased health risks for vulnerable populations, and the lack of digital services alongside decline in informal sector activities (e.g. during lockdowns) has worsened their economic state.

Rebuilding a 'New Normal' urban economy: A suite of economic support packages to assist smaller businesses, informal workers, and vulnerable sectors during the crisis, focusing on creating greener and more equitable urban economies. Despite financial constraints, local authorities should remain committed, supported by national governments, to ensure continuous assistance and services to residents and businesses.

Clarifying urban legislation and governance arrangements: Authorities must acknowledge the necessity for more integrated and cooperative multi-level governance, with flexible and innovative institutional and financial frameworks. Governments at all levels have responded creatively to the ongoing crisis, employing greater collaboration, increased autonomy, and recentralization of responsibilities. Although the results are often inconsistent and debated, they have led to valuable new strategies and insights that should be preserved beyond the pandemic.

Source:
Cities and Pandemics: Towards a more just, green and healthy future, UN-Habitat, 2021

2.5 Urbanisation and environmental challenges

As economic generators and major contributors to national GDP, cities and local authorities should have the political, institutional and economic resources and mandates to address emerging challenges, especially in rapidly urbanizing contexts.

The environmental impact of cities and towns increases due to both the growing urban populations (demographic »weight«) and the share and volume of natural and other resources they consume. Every aspect of urban life has significant sustainability implications for the planet, from production and consumption to the energy and other resources needed on daily basis, e.g. for movements of people, construction of buildings, heating and cooling, provision of food and water etc.

Urban communities are increasingly exposed to water and air pollution, waste and toxic chemicals, as well as, environmental hazards such as floods, tsunamis, earthquakes, droughts and landslides. These are severe problems which urban residents seldom can respond to individually. The urban poor and other vulnerable groups are often the most affected by environmental degradation or weak environmental management, as they usually are more dependent on local natural resources for their livelihoods.

The main street of Bissau with hectic traffic, unregulated economic activity, informal trade and small-scale services.

Many environmental challenges can be derived from the economic, social and cultural systems in cities and towns – but also from collective and individual behavioural patterns and attitudes. Urbanisation and related environmental and climate challenges have impacts on the planetary systems[21] and the UN[22] has identified the *triple planetary crisis – climate change, pollution and biodiversity loss* – as critical to urgently respond to. Globally, we are on average consuming more resources than the earth can provide and a paradigm shift in our shared vision for future society is needed in the short and longer term.

[21] https://www.stockholmresilience.org/research/planetary-boundaries.html.
[22] UNFCCC, UN Environment among others.

EXAMPLE

A COMPREHENSIVE URBAN RESILIENCE FRAMEWORK WITH AN INSTITUTIONAL LENS

During the years 2018–2025, SALAR International, the Union of Municipalities of Türkiye, and the regional unions of Marmara and Çukurova Municipalities, cooperated within the Resilience in Local Governance project (Reslog). The partnership was established in response to the Syrian crisis to strengthen municipal resilience towards intense migration flows, aligning with principles of inclusion and good governance.

One early finding was that existing resilience analysis frameworks often focused on specific themes (e.g. climate, disaster risk reduction) or city-level primarily addressing resilience at an urban systems level – e.g. focusing on infrastructure, environmental sustainability, economic systems, and community well-being. But they often lacked addressing the institutional resilience of municipal governance structures, administrative processes, and service continuity mechanisms. Therefore the Reslog-project developed a unique Integrated and Inclusive Resilience Framework (2IRF) to support Turkish municipalities in their long-term resilience planning filling a critical gap by strengthening the internal governance, decision-making processes, and institutional capacity of municipalities.

A multi-shock and multi-stress resilience framework

2IRF looks at five main categories of shocks: Environmental; Economic; (Geo)political; Societal; and Technological. In addition it includes longer term stress factors that could quietly weaken institutional systems over time, e.g. urbanisation and migration pressures, climate change and environmental degradation, institutional limitations, and socio-economic inequalities and segregation.

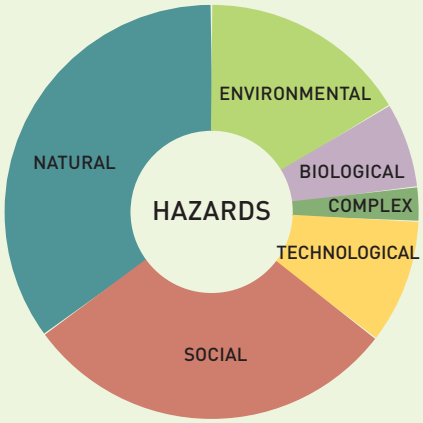
From this a criteria set is defined around the fundamental question: What constitutes a resilient municipality? This set of criteria serves as the foundation for assessing, strengthening, and guiding municipal resilience efforts providing a structured, multi-dimensional framework that municipalities can use to evaluate their preparedness across key areas. The 2IRF Criteria Set consists of eight main criteria, each comprising multiple sub-criteria – resulting in a total of 54 indicators that collectively define a municipality's resilience.

The eight main criteria are:

1. Institutional governance, strategic capacity and leadership
2. Financial resilience
3. Infrastructure and urban services
4. Crisis/Stress management and emergency
5. Environmental and climate resilience
6. Health and social development
7. Economic development
8. Monitoring, evaluation and continuous improvement

For each of the indicators deemed relevant for a specific municipality, multi-sectoral teams assesses and scores the current status and impact, and identifies actions needed to strengthen long term resilience in that area. Reslog's 12 pilot municipalities in Türkiye used the outcomes from the comprehensive resilience assessments when defining their mandatory five-year strategic plans, often prioritising institutional and service areas that came out as 'weak' and in need of strengthening in the analysis.

Different types of risks and hazards.



Crossing boundaries increases the risk of generating large scale abrupt or irreverible environmental change.

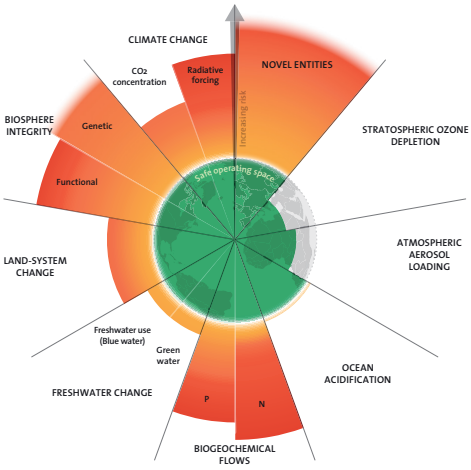


Figure 2.6
Crossing planetary boundaries increases the risk of generating large scale abrupt or irreversible environmental change. In 2025, seven of the nine boundaries were crossed.
Source: Azote for Stockholm Resilience Centre.

Natural and artificial hazards

According to the UNDRR[23] there are different natural and man-made hazards such as *meteorological and hydrological events* (e.g. floods, storms, cyclones, heatwaves), *geological* (e.g. earthquakes, landslides), *environmental* (pollution, ecosystem collapses), *chemical* (release of hazardous substances), *biological* (epidemics, pandemics) and *societal* (conflicts, displacement).

The five most critical hazards include *earthquakes, extreme heat, storms, floods, and droughts*, triggering 90% of disaster deaths between 2000 and 2023 impacting both developed and developing countries. In addition, the *Global Assessment Report 2025*[24] indicates that the direct costs related to disasters amount to USD 202 billion annually, and over USD 2,3 trillion when cascading and ecosystem costs are included.

As a result of urbanisation trends and associated impacts the urban population is even more exposed to both man-made and natural risks and hazards. The urban poor are especially impacted due to settlements, in many cases informal, often being located on the periphery of cities, or on marginal land such as steep hillsides and volcanic slopes, flood-plains and swamps, railroad reserves, waste dumps and desert fringes, etc.

Earthquakes are primarily geological processes and can't be prevented. However, mitigation measures can be taken to minimize the risk, vulnerability and exposure, for example through modern design regulations, strategic urban planning and enhancing risk awareness. Between 1994 and 2024, some 830,000 people died in earthquakes and associated hazards through physical and/or social vulnerability. Unsuitable construction methods and location of buildings can exacerbate the impacts.

Extreme heat events are becoming more frequent and severe due to climate change, with 2024 as the hottest year on record[25]. Rising global temperatures, driven by greenhouse gas emissions, poses significant risks, especially in urban areas where heat stress exacerbates health, social, and economic challenges. Prolonged exposure to extreme heat can lead to severe health crises and even death, while threatening the productivity of billions of people. Urban centers are particularly vulnerable due to the *Urban Heat Island* (UHI) effect, which intensifies heat exposure through reduced green spaces, heat-absorbing infrastructure, and waste heat from human activity. With almost 70% of the global population expected to live in urban areas by 2050, these risks will disproportionately impact vulnerable populations, including those in poverty, women, children, and the elderly. Multi-sectoral collaboration is crucial to address these challenges effectively, with local governments playing a central role in implementing heat-resilient strategies integrated in strategic urban development plans.

Fires in urban areas present a key hazard killing over 150,000 people every year. 95% of these events occur in low- and middle-

[23] UN Office for Disaster Risk Reduction.
[24] https://www.undrr.org/gar/gar2025.
[25] Making Cities Resilient 2030 (2025). Urban Heat Risk Management Resource Package, UNDRR.

income countries, impacting especially residents in informal and refugee settlements.

Globally, informal settlements have grown with 130,000 million inhabitants between 2015-2022, corresponding to some 50,000 new settlers per day. Many sites are poorly located, unattractive and hazardous, often prone to flooding or landslides or exposed to air pollution triggered by waste sites, proximity to heavy transport routes or industries. Instances also occur where the lack of planning and provision of housing and basic services force labour to locate closer to work places, formal and informal.

Local governments and other actors can enhance resilience and mitigate the impact from risks and hazards by integrating such aspects into strategic and urban planning activities, for example by ensuring appropriate land use, provision of public space, embedding nature-based solutions and ecosystem services in planning and design solutions. Accessing relevant data on possible risks is essential, not least to make informed assessments and decisions for the future.

EXAMPLE

HIGH-RISK FLOOD ZONES

Since 1985, over 75,000 km² of new urban land, equivalent to about 50 times the area of Greater London, has been developed in areas prone to severe flooding. Globally, 1.8 billion people – one in four – live in high-risk flood zones, with the majority living in rapidly urbanizing river plains and coastlines in developing countries.

Source: World Bank / Urban Development

Areas of conflict, such as in Ukraine [26], are often severely exposed to environmental degradation and destruction. Armed conflicts tend to increase release of chemicals which together with fires, explosions and the establishment of mine fields and unexploded ordnance (UXO) contribute to direct and indirect damage to ecosystems, resulting in environmental and socio-economic losses. Further, destruction of infrastructure and energy facilities as well as residential and commercial buildings results in debris and enormous waste management problems as well as pollution of air, water and soil, also causing health implications. Responding to environmental degradation during times of war is problematic, as equipment and personnel are drawn into the military. Environmentally protected areas are inaccessible due to the presence of UXO which hampers ability to prevent or extinguish fires. While these consequences have direct impacts, they also affect the long-term social, economic and environmental recovery and reconstruction.

»The environmental damage poses profound and enduring risks to human health and well-being that extend far beyond immediate impact.«

Ukraine Fourth Rapid Assessment and Needs Assessment

EXAMPLE

SETTLEMENTS IN HAZARDOUS LOCATIONS

Settlements and infrastructure are exposed to various man-made and natural hazards such as flooding, land slides, storms and tsunamis, earthquakes and volcanic eruptions etc. UNDDR advocates that adopting resilience in infrastructure provision will:

- Assist in raising awareness and setting a common basic understanding of what »resilient infrastructure« constitutes;
- Form the basis for planning and implementation of infrastructure projects that take resilience as a core value;
- Raise engineering designs based on available and reliable data so parameters of safety and disaster risk mitigation are in place on new and retrofitting projects;
- Set out the desired outcomes of national infrastructure systems to establish resilience of critical services; and,
- Assist the public and private sectors in making risk-informed policy and investment decisions

Source: UNDRR, Principles for Resilient Infrastructure, 2022

[26] Fourth Rapid Damage and Needs Assessment (RDNA4) February 2022 – December 2024, World Bank, UNDP et al.

EXAMPLE

FUTURE-PROOF, INTEGRATED AND PHASED PLANNING FOR RESILIENT RECOVERY FROM THE EFFECTS OF WAR

Since 2024, through the Polaris Programme, SALAR International supports locally led recovery in municipalities (hromadas) and regions (oblasts) affected by the full-scale invasion in Ukraine since 2022.

An important strategy to mitigate the impact of war on local communities in Ukraine is recovery efforts driven by hromadas themselves, in close coordination with national institutions. Supported by SALAR International, this initiative focuses on the development of comprehensive, integrated and multi-sectoral strategic and recovery planning documents in municipalities and regions in an inclusive, evidence-based and future-proof manner. The approach builds on SymbioCity principles for holistic and integrated planning that consider future needs, risks and resilience, sustainability and EU integration. This ensures that municipalities and regions will be able to consider a range of recovery scenarios, whilst also defining overarching longer-term planning priorities, and identifying priority projects with indications on scope, budget and timeframe. The methodology is underpinned by a participatory approach focusing on transparency, accountability and cross-cutting principles, including sensitivity to gender and intersectionality, needs of vulnerable groups, and integrating restoration of human capital.

Through the project, technical and capacity building support is provided to hromadas and oblasts on strategic- and urban planning and specific thematic issues and skills, including data management and geo-spatial mapping. The aim is to enable local and regional authorities to lead data collection, community and stakeholder engagement, and robust analysis for short- to long-term planning. Municipalities are supported to identify projects that address specific service delivery and infrastructure priorities and with the aim of stimulating local recovery, as well as further recovery financing.

PHOTO Klas Groth

The methodology is iteratively developed, based on internationally recognised approaches to resilience, recovery and sustainable urban development, tailored to the Ukrainian context and taking account of Ukrainian legislation and planning experiences since 2022.

Mobility and transport related challenges

Rapidly growing urban areas tend to experience urban sprawl due to insufficient strategic spatial planning and lack of corresponding investments in mobility infrastructure to meet a growing demand. Improved global prosperity and GDP per capita has historically led to an increase in the use of private vehicles, causing increased noise and air pollution (health), congestion and accidents. In addition to deaths, injuries and stress symptoms, these impacts together with decreased productivity also causes significant economic losses.

According to the *World Health Organisation*, 1,2 million people die each year due to road traffic accidents of which 92% occur in low- and middle-income countries where also some 60% of the world's vehicles are. More than half of all road traffic deaths are among vulnerable road users such as pedestrians, cyclists and motorcyclists.

The transport sector contributes significantly to climate change and accounts for nearly a quarter of global energy-related emissions of carbon-dioxide, and some 15% of global greenhouse gases.

The sector and the extensive use of vehicles is also accountable for a large portion of noise and air pollution, and exhaust from vehicles cause severe health problems and premature death. An estimated 4,2 million people die due to ambient (outdoor) air pollution, leading to e.g. respiratory diseases and cancer. Particles of sulphur dioxide, nitrogen oxides and photochemical oxidants (especially those smaller than 10 microns) that are deposited in the lungs cause respiratory problems such as asthma and bronchitis, and may lead to respiratory mortality. Children in particular are sensitive to these emissions.

Recent technological advancements, e.g. reduced emissions of particulate matters and carbon monoxides etc, together with alternative fuels and an increasing transition to Electrical Vehicles (EVs) can help reduce the negative impact on the environment.

More importantly, strategic and urban planning coupled with investments in alternative mobility systems such as *integrated public transport* and *Non-Motorised Transport* (NMT), is needed to improve mobility and accessibility in urban areas. This also makes use of available space more efficiently, enhances safety in the mobility environment and contributes to enhanced productivity.

KEY FACTS

AIR POLLUTION AND HEALTH

Long-term exposure to air pollution contribute to millions of deaths in India, reports Karolinska Institutet. Air containing particles smaller than 2,5 micrometers in diameter (PM2,5) can enter the lungs and bloodstream, causing major health issues. In many places in India, the PM 2,5 levels exceed WHO guidelines exposing almost 1,4 billion people yearly.

Source: https://news.ki.se/air-pollution-in-india-linked-to-millions-of-deaths

PHOTO Wikinut, Internet

Energy

Cities are drivers for economic growth while also accounting for some 75% of global energy consumption associated to sectors such as transport, heating/cooling and construction. According to IEA (2023 [27]) current sources of the global energy generation include coal (~28%), oil (~30%) and natural gas (~23%), while the remaining sources are distributed across nuclear (~4,7%), hydropower (~2,3%), solar power (~3,1%) and biofuels and waste (~8,8%). The use of fossil energy sources is closely linked to climate change and the emission of greenhouse gases.

[27] International Energy Agency, https://www.iea.org/world.

Environmental management cannot be treated separately from other development concerns, and it is essential to integrate environmental considerations into policy and planning for subsystems such as energy, transport and industry.

Generation of electricity most often comes from transforming energy sources e.g. harnessing the heat from burning fuels (oil, coal) which in many ways is an unsustainable and inefficient form of generating electricity. At the local level, many urban dwellers are exposed to air pollution attributed to the use of fossil fuels causing major health implications with pre-mature deaths. Accessibility to energy and electricity also has social implications and needs to be improved for many households to ensure daily chores, education, safety, economic activities etc, especially for informal settlements and the urban poor.

Pro-active strategies and policies are needed to reduce energy demand, enhance energy efficiency and accessibility, and to encourage the transition to *renewable energy sources* such as solar, wind and hydro. Cities and local authorities can the lead and accelerate the transition to clean energy due to dense populations, businesses, and innovation.

EXAMPLE

ACCESS TO ELECTRICITY

- 100 million people live in cities without access to electricity.
- 90% of these are located in Sub-Saharan Africa, the fastest urbanising region globally.
- More than 60% of public investment occurs at the subnational level, of which nearly a third is channelled into transport systems, underlying the importance of cities investing in green and resilient urban infrastructure.

Source: International Energy Agency, 2024

A lack of green areas and biodiversity

Sustainable urbanisation requires the creation and preservation of *ecological systems* and networks, including green open spaces, wetlands, forests and agricultural areas. Environmental efficiency, i.e. the environment's ability to provide benefits and human well-being without being negatively impacted, implies a reduction in the use of resources while the products and services delivered should meet human needs.

Ecosystem services are natural environmental processes providing benefits that are vital to human health and the functioning of urban areas, for example in the production of oxygen, storage of carbon, and filtering toxins and pollutants. Ecosystem services can protect against impact from climate change and are essential for sustainability and resilience of urban areas, as well as the natural protection of coastal and other zones from flooding, wind exposure, erosion etc. The resilience and biocapacity of ecosystem services is therefore crucial.

Human activities such as land development, pollution, poor waste management (incl. illegal dumping) and destruction of wetlands and green environments can harm such ecosystem services and lead to loss of biodiversity. Increased urbanisation leads to higher demands in the use of natural resources, imposing significant stresses on environmental processes that deliver ecosystem services. Urban areas need to be in balance with nature, where *nature-based solutions* and green and blue systems and networks (within and around urban areas) preserve the biological diversity and strengthen ecosystems services. Within such an environment, opportunities can be provided for sustainable farming, gardening and energy production. Even small green areas in cities can maintain high biodiversity, especially wetlands [28].

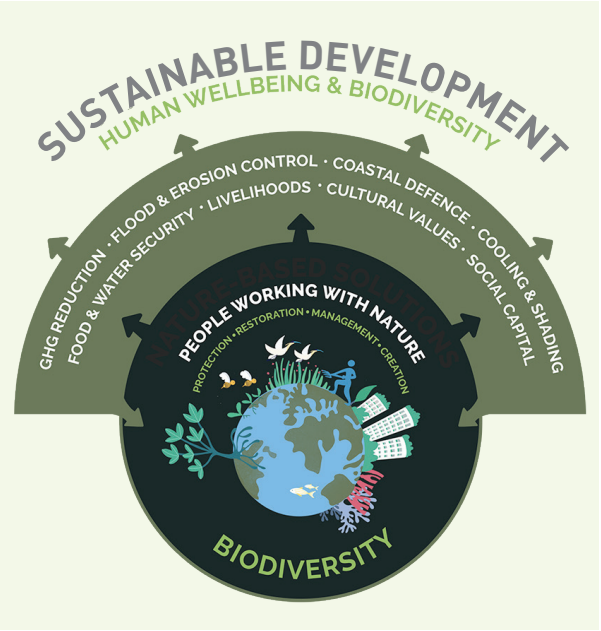


Figure 2.7
Nature-based Solutions are biodiversity-based actions that work with natural systems to address societal challenges while respecting the rights and knowledge of local communities.
Source: Nature-based Solutions Initiative | What are Nature-based Solutions?

According to the FAO, an estimated 733 million people were undernourished in 2023, and where food insecurity exists it was higher in rural than in urban areas. Regional differences occur with Africa having almost twice the level of insecurity compared to the global average. If well planned and managed, urban agriculture on marginal and public land can contribute to addressing this problem and improve child nutrition. Arguments for increased urban agriculture include:

- shortage of supply and access to food in developing countries;
- dependency on long-distance transport, which increases emissions and reduces product quality;
- the need to decrease GHG emissions in the agricultural sector, which accounts for 11,7% (WRI, 2021 [29]) of the total emissions;
- shortage of other resources, e.g. energy, water and nutrients;
- the creation of jobs and strengthened communities.

Climate change and human activities such as change of land use, deforestation, agriculture, pollution and industrial processes are key driving factors behind the accelerated loss and degradation of ecosystem services. Besides potentially affecting food provision and human health, can significantly also reduce the revenue of cities. The poorest and most vulnerable communities are often directly reliant on these services in order to meet their basic needs.

Waste problems and waste management

Over 2,1 billion tonnes of municipal waste is generated globally each year (2024 [18]), a figure expected to increase until 2050. Some 38% represent »uncontrolled« waste, i.e. waste that is dumped openly or burned while 62% of the waste generated is managed in a controlled manner through landfills (30%), recycling (19%) or in »waste-to-energy« systems (13%). There are regional

EXAMPLE

THE ECONOMIC VALUE OF MAINTAINING ECOSYSTEMS SERVICES

Ecosystem services can be categorised as provisioning (benefits extracted or harvested from ecosystems), regulatory (ability of ecosystems to regulate biological processes), or cultural (perceived or actual experiential and intangible services). In 2017, a spatial valuation of ecosystem services in Ethekwini Municipality (Durban, South Africa) assessed the total asset value to be at least R48–62 billion, or R4.2 billion per year (appr. USD 330 million).

Sources:
NCAVES and MAIA / UNDESA (2022),
World Bank (2017)

[28] This was first recognised in an urban context by theorist Patrick Geddes in Geddes, P (1915) Cities in Evolution. London: Williams and Norgate.
[29] World Resources Institute, 2021.

variations in the management of waste, often worse in developing and low-income countries where slums and informal settlements experience no organized collection at all.

Improved policies and investments in sustainable waste management systems are critical to decrease the impact from waste on the climate (transport, processing, emissions from landfills etc.), biodiversity (chemicals in soil and water bodies etc) and pollution (diarrhoea, malaria, cancer etc). The waste sector is often partly informally organized, adding complexities in accessing reliable data and to adequately respond to the challenges.

Sanitary landfills and other controlled waste systems are rare in the developing world and the discrepancy between the rate of waste generation and controlled waste management is severe. In particular waste from the construction sector as well as hazardous and contagious waste from industries, hospitals and households is critical to manage properly. Uncontrolled use and dumping of such waste leads to bio-accumulation of persistent organic toxins in the entire food chain, affecting everyone, rich and poor.

Poor waste management can also be a direct major health hazard in that waste presents an income for many poor, e.g. trading in waste and work as scavengers on uncontrolled waste dumps. Poor management of waste disposals also results in diseases spread by vectors such as rats, dogs, monkeys and birds.

Poor waste management is often a combined environmental and health hazard.

EXAMPLE

IMPROVING WASTE MANAGEMENT

UNEP estimates the global generation of solid municipal waste to increase from 2.1 billion tonnes (2023) to 3.8 billion tonnes by 2050. In 2020, the direct and indirect costs (pollution, health, climate change) of waste management was estimated to USD 360 billion, estimated to double by 2050 if no action is taken.

- Nepal enhanced their waste management services to a 70% coverage in five cities trough a results-based approach including 120,000 households (2013-2017).
- Intermunicipal collaboration in Bosnia and Herzegovina reduced unserved communities from 75% to 34% (2008-2017).
- Morocco introduced a waste governance framework increasing collection from 44% to 96%.

Source: UNEP and World Bank

Access to water

Access to water has increasingly become a critical concern due to growing populations, impacts from climate change, and increasing and high consumption of water in industries like agriculture,

[30] Global Waste Management Outlook 2024, UN Environment.

livestock, energy production and manufacturing. Water as a resource should be carefully accessed, managed and treated.

Water scarcity

Water stress and scarcity varies across regions, where countries in northern Africa and Asia are facing extreme scarcity, attributed to extended droughts, *drops in groundwater tables and increasing stress and pollution of the natural environment*. On the other hand, following climate change some regions also experience irregular and heavy precipitation, often at levels beyond the earth's capacity to absorb and store the water.

Agriculture is among the sectors with the highest usage of freshwater consuming some 70% of available freshwater resources. In low-income countries this amounts to 90%, while standing at 44% in high-income countries, however with a higher share used for the industrial sector [19].

Water scarcity and efficient use of fresh water require integrated water resources management, at national and local levels as well as internationally (transboundary cooperation).

»Recycling is not the ultimate goal of waste management: it is always better to reduce waste by preventing it in the first place«

UN Environment

Fresh water and sanitation

From 2015 to 2024, access to fresh water improved globally with 74% of the population having *access to safely managed drinking water*, 58% to sanitation, and 80% with access to basic hygiene facilities. In urban areas globally, 86% of the population enjoy safely managed drinking water. However, there are significant challenges in the provision of water services in informal settlements, high pricing and sometime lack of quality control of water from private vendors.

In 2022, some 57% of the global population had access to a *safely managed sanitation service* while 1,5 billion people still were lacking access to toilets or latrines. Poor water and sanitation conditions typically reduce human well-being, social and economic development, e.g. through anxiety, risk of sexual assault or lost opportunities for education and work. Further, poor sanitation is linked to transmission of diarrhoreal diseases (e.g. cholera, dysentery, intestinal worm infections and polio) in turn stunting and spreading antimicrobial resistance. Residents in unserviced slums and informal settlements, i.e. areas often exposed to natural hazards (flooding, sea-level rise, landslides etc), are less resilient to shocks while also at constant risk of disease outbreaks.

The global population is growing and a considerable number of people still have no access to fresh water. The UN recognizes that *access to safe, affordable, and sufficient water* is a basic right, where between 50 to 100 liters per capita per day should be accessible for personal and domestic uses.

[31] World Bank, https://datatopics.worldbank.org/sdgatlas/goal-6-clean-water-and-sanitation.

KEY FACTS

ACCESS TO FRESH WATER

- Only 2,5% of the earth's water is fresh water, while the vast majority is saline.
- A person needs 50-100 liters of water / day at minimum to meet basic drinking, hygiene and cooking needs.
- Food production requires 2-5 m3 of water daily to produce a persons food needs.
- Countries in the Middle East and North African regions have critical or high water stress levels.
- India, China, the United States and Pakistan are the largest users of groundwater.

Source: https://datatopics.worldbank.org/sdgatlas/goal-6-clean-water-and-sanitation

CONNECTION TO SEWAGE SYSTEMS

In the capital cities of Kinhasa, Democratic Republic of Congo (18 million inhabitants) and Brazzaville, Republic of Congo Brazzaville (2 million inhabitants) – located on respective side of the Congo River – only 5,5% and 11% of the populations respectively are covered by the sewer system discharging wastewater directly into the river.

Source: International Water Association

Water management

Due to rapid urbanistion the provision of adequate water and sanitation services are not at pace. Strategic urban planning, including budgeting and infrastructure provision is needed to ensure good health conditions and where pollution from wastewater is limited. Safely treated wastewater stands on average at 56% globally. This needs to be improved to limit the risk of further pollution. Wastewater should be regarded as a resource, and if properly treated, it can be used for irrigation of food production. According to the WHO (2014), studies indicate that for every USD invested in WASH (Water Sanitation and Hygiene) there is a return of USD 4,30, e.g. in reduced medical care. Strategies for the management of available water resources (fresh water, wastewater, stormwater) are needed to ensure safe and sustainable overall access to water.

Water supply and sanitation is typically a local responsibility but local governments often lack the institutional, technical and financial capacities to sufficiently address the challenges, including investments in relevant infrastructure. Privatisation of water services is sometimes implemented as a solution, as infrastructure deteriorates and public investment fails to keep pace with urbanisation. However, privatisation typically leads to reduced access, higher prices and water cut-offs in poor communities, and often meets local resistance.

The direct health implications of poor sanitation and water supply are the primary concerns, but the mismanagement of water also has a negative environmental impact on rivers, lakes, shores and groundwater. Rivers and lakes that are over-fertilised by sewage typically results in changed fauna and flora and even extinction of species, contamination of groundwater by nitrates and bacteria, and that other water supply sources are contaminated etc.

Causes of environmental and health problems

Urban environmental and health problems of the kind described above have many sources and causes: *over-rapid and uncoordinated urban growth, population increase and spatial demands, insufficient investment* in services*; inadequate technology* in industry*;* increasing and environmentally *unsound mobility and transport systems; inadequate sewage systems* emitting untreated wastewater from industry and households into the environment, *unsatisfactory waste management*, etc.

Sub-optimum use of natural resources and limited environmental conservation and protection is caused by a »siloed« approach where each sector is treated separately. Inefficient supply and use of non-renewable and remote energy sources cause environmental degradation and health problems e.g. through air pollution and emission of GHGs. The lack of clean technologies and renewable energy impact millions of people with health,

In 2022, some 57% of the global population had access to a safely managed sanitation service while 1,5 billion people still were lacking access to toilets or latrines.

River clogged with waste while adjacent buildings are in risk of flooding.

environmental and socio-economic implications. Urban residents in the developed world use less energy per capita than rural residents, while in developing countries the opposite sometime apply.

KEY FACTS

URBAN HEALTH CRISIS

Rapid and unplanned urbanisation is often interrelated with a deteriorating environment and a wide spectrum of health hazards. Residents in slums and informal settlements are particularly vulnerable due to lack of access to clean water, sanitation and hygiene facilities.

Total environment: 24% of all estimated global deaths are linked to the environment

Household air pollution: 3.2 million deaths every year as a result of exposure to indoor smoke from cooking fuels

Ambient air pollution: 4.2 million deaths every year as a result of exposure to fine particulate matter

Wash:1.4 million people die each year as a result of inadequate drinking water, sanitation and hygiene.

Source: World Health Organisation, WHO, 2022

Underlying the above causes and sources of current and emerging environmental problems, there is often a *lack of financial resources and institutional capacity* to address the challenges. Authorities dealing with environmental management are sometimes weak, and use outdated, top-down management and decision- making practices. *Legislation can be inconsistent, sometimes contradictory* or unenforceable and *resources for implementation and monitoring* are scarce. Environmental policies are seldom effective in stimulating improvement. Municipal budgets are often limited and mainly spent on recurrent costs, while major capital investment requires financing from national government or alternative sources. *Corruption* is a common barrier to effective environmental management, e.g. the uncontrolled issue of permits to extract natural resources and poor enforcement of pollution control regulations.

Environmental management cannot be treated separately from other development concerns, and it is essential to integrate environmental considerations into other policy areas and urban systems such as energy, transport and industry. Improved environmental management requires an enabling environment, where policy and institutional arrangements cut across sectors and through national to local levels.

In many cities in developing countries there are insufficient incentives stimulating *collaboration and coordination* between actors responsible for sectors such as waste management, planning, energy, transport, traffic and environmental management. Consequently, the value that could be added by cooperation and harnessing synergies is not realised. Urban governance and management here play a critical role.

For example, incinerating waste (as a resource) can generate biogas, electricity, and energy for heating or cooling, providing added value and benefits in terms of resource efficiency and saving of costs. The energy generated could be sold at a profit while waste volumes are decreased, and public transport could access comparatively cheap fuel for buses, which in turn, reduces purchasing of more expensive non-renewable energy and the emission of harmful substances. This is just one example where enhanced integration of different urban systems can generate financial, environmental and societal gains.

2.6 Socio-cultural challenges of sustainable urban development

Socio-cultural and socio-economic aspects of urban life are essential aspects for human well-being and sustainable urban development. Typical positive socio-cultural and socio-economic aspects relate to e.g. enhanced prosperity and economic growth; job creation and employment opportunities and livelihoods; productivity and innovation; access to affordable housing, social services and functions; social cohesion, culture and identity; inclusion, gender and distribution of power; safety and security; religion; education; migration and urban-rural linkages etc. While entailing clear opportunities these aspects also bring their own set of challenges.

These aspects are in many ways intertwined and should not be addressed separately due to the complexities and dynamics of urban areas. In many ways, the socio-economic elements relate to equitable access to basic physical and social services, structures and networks, with equitable distribution and provision for all.

Furthermore, the urban poor and marginalised and vulnerable groups, who live in informal settlements without land titles, not registered as inhabitants of the city, and without adequate access to basic services, are usually excluded from urban development planning and decision-making and influence. Thus, inclusive development processes are essential for people to enjoy basic rights to life, health, adequate water, food, housing and public services.

Access to adequate housing

The provision and access to *adequate housing* in urban areas is fundamental. Currently, there are some 3 billion people globally that struggle to afford housing, while 1,12 billion people still live

in slums and informal settlements without access to basic services. Unaffordable urban housing, inadequate living conditions and displacement (incl. homelessness) are factors that diminish quality of life and exacerbate social and economic exclusion in society. Inadequate and poor-quality housing impact on the well-being of residents as well as the finances of the household. In many urban areas, housing provision has failed to cope with the rising demand. Globally, public investment in new homes has declined, and barriers towards affordability include scarcity of land, restrictive building regulations and increasing construction costs. Stigmas related to housing for particular groups (seniors, migrants, refugees etc) can lead to a difference between supply and demand. Housing is a basic human right and securing access to affordable housing requires clear regulatory frameworks, tenure rights and financial incentives.

Currently, there are some 3 billion people globally that struggle to afford housing, while 1,12 billion people still live in slums and informal settlements.

Spatial inequalities

Ideally, cities and urban areas should be *compact, connected, inclusive, vibrant and resilient*, towards which proper urban planning of mixed-use areas contribute to a built environment with better opportunities for employment and income generation, variety in housing options, enhanced safety and better use of public services and spaces. The urban fabric, it's physical form and spatial distribution, is critical to support a more socially cohesive urban environment.

Many cities and towns experience significant differences between communities (districts, neighbourhoods) in terms of quality of the built environment, economic opportunities, and access to services and cultural and recreational activities. This can lead to social (and economic) segregation and exclusion from society. Spatial inequalities need to be addressed as a priority in urban development processes to promote inclusion and overall sustainability. New settlers and in particular migrants risk facing exacerbated problems instigated by discrimination, misperceptions, cultural and language differences, as well as inadequate access to housing, services and income opportunities, as potential barriers towards inclusion.

Photo Vierp Larsson /

Provision of basic services is essential for healthy living conditions and environmental improvements.

Public realm, gender and safety

Urban dwellers make use of urban space differently and for different purposes. Studies suggest that girls and women use the public space of an urban areas different than to men and boys. Integrating a gender-responsive approach to planning and development promotes inclusive, safe and equitable urban spaces, where the perspectives of e.g. women, children, and the elderly are given equal priority and opportunities in the built environment. This perspective should be applied in all phases of urban development – from planning and design, to implementation and monitoring.

A well planned and designed built environment encourages *community ownership* of public areas and promotes social cohesion.

Perceived and actual *safety and security* in urban areas is critical. The spatial distribution of urban functions, access to infrastructure and basic services, as well as an attractive and inviting public realm (public space, urban plinth) can provide the conditions for both enhanced safety and social interaction. Access to functional *public spaces* (squares, parks and other green areas) and recreational and sports facilities is vital, as are cultural and religious places, schools, libraries and other public services and meeting places.

Identity and sense of place

Socio-cultural dimensions also relates to the *origin*, *history and development* of a particular area, attributed to both a tangible and intangible heritage. Cultural and historical features and activities strengthen a sense of community identity, which good urban planning and design should embrace and enhance. This can be particularly important for new residents, having migrated from e.g. their rural home of origin losing connection with families and social networks.

PHOTO Klas Groth

An attractive and functional public space promotes social interaction and economic development.

2.7 Economic challenges of sustainable urban development

Urban areas are the 'engines' of *cultural, social, political and economic development*. Addressing barriers towards economic sustainability requires interventions on various levels - from macro to local, from improving governance and management of urban areas, to enhancing opportunities for businesses, innovations and entrepreneurship.

Cities are generally the *major drivers* of economic development, job creation and wealth, and currently generate approximately 80% of global GDP (Gross Domestic Product). However, the value generated is not always harnessed or distributed equally. Typically, there are a number of internal and external barriers and factors that influence the conditions and opportunities for sustainable economic development and growth of cities and urban areas. These include: uncoordinated governance and management systems; weak or inactive employment markets; lack of adequate education, skills and training often leading to exclusion from economic activities; capacity and interest for investments (e.g. by private sector); limited access to financial institutions, as well as, environmental factors with indirect effects such as health and traffic congestion hampering productivity and prosperity.

Spatial inequalities for economic development

Unplanned urban growth coupled with inefficient and uncoordinated land-use often limits an equitable provision and access to economic activities, affordable housing and services, as well as, in the provision of key infrastructure that often is strained, costly or even completely lacking. This collectively hampers economic development and contributes to spatial inequalities, in particular affecting groups living on the outskirts or on marginal land.

PHOTO vleyva, pixabay

Spatial, economic and social inequalities are often manifested in informality.

The spatial organisation of cities and towns is therefore key in establishing the pre-conditions for economic development and the mitigation of spatial inequalities by ensuring equitable distribution and access to economic activities and services. A compact and mixed-use urban environment promotes an efficient use of resources and that increases the potential for synergies between different economic activities, enhancing productivity while limiting the time spent on commuting and other less productive situations. Connectivity and accessibility are key elements in this regard.

Insufficient capacities at the local level

Local governments are central for service delivery and mobilization of resources for local urban growth. However, local governments often lack necessary decentralised mandates, or institutional capacities and resources and are in many instances reliant on the national government. Available resources for service provision are often constrained, limiting possibilities to meet current needs, addressing backlogs, and to ensure service provision for a growing population. Revenue collection, both own-source and others, look different across local authorities and is often characterized by weak capacities and dependencies on other levels of government.

Despite limitations and constrained possibilities, local governments can sometimes raise their *own revenue* through local taxes, user fees and charges. But often they need to be empowered to increase and diversify sources of revenue to enhance fiscal autonomy. While urbanisation sometimes is rapid, local authorities need a long-term approach to economic development building upon a clear vision, relevant policies, and realistic cost-recovery on investments, particularly in major service infrastructure. A long-term perspective to sustainable economic development goes beyond political cycles and short-term agendas, where integrated approaches link economic development and growth to other aspects of urban development under a common vision and framework.

Local authorities need a long-term approach to economic development building upon a clear vision, relevant policies, and realistic cost-recovery on investments.

Institutional fragmentation and policy inconsistencies

National and local governments are key in promoting inclusive economic development and growth, but are often strained by uncoordinated and outdated *strategies, policies and regulatory environment.* Such barriers contribute to institutional fragmentation hampering opportunities for economic development. But this can be mitigated by a stronger alignment and coordination among institutions, vertically and horizontally. Further, a cohesive policy and regulatory environment that balances the requirement for economic development with other development aspects is essential, also against available resources.

Building partnerships and coalitions between public and private sector can support sustainable economic development, for example by private sector engagement, business development

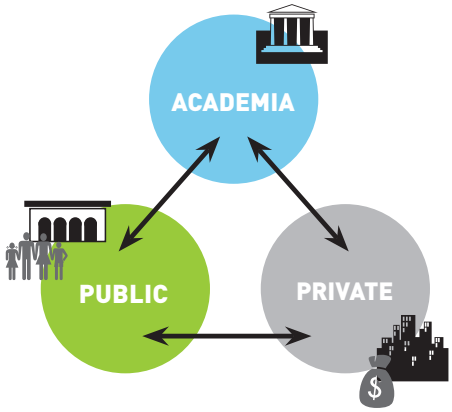


Figure 2.8
The 'Triple Helix Model' promotes cooperation between the public, private and academic sectors, in order to achieve sustainable urban development.

and innovation, where the interaction and cooperation between the private sector, academia and the public sector can contribute to economic development (sometimes referred to as the *Triple Helix Model*). Such cooperation can also promote institutional strengthening and skills development for all parties, while addressing challenges such as urban poverty, unemployment and inequality, thereby contributing to a better quality of life.

Infrastructure gaps

Globally, urban areas suffer from a lack of investment in key infrastructure in sectors such as transportation, housing, water supply and energy etc. This is even more dominant in developing countries where vulnerable, low-income and informal settlements are most affected. This infrastructure gap, i.e. the difference between what infrastructure that exits and what they need, should be addressed to ensure inclusive and sustainable urban development.

The World Bank suggests the financing need to address gaps in infrastructure provision at USD 1,5 trillion yearly, translating to some 4,5% of the GDP in low- and middle-come countries. A key challenge here is the cost for *maintenance and operations*, sometimes not fully considered in infrastructure investments.

The informal sector employs some 60% of the global workforce.

Urban informality

The informal economy is key for many inhabitants in urban areas in providing livelihoods and services. The informal sector, employing some 60% of the global workforce according to ILO[32] often appears as a parallel system to the formal, regulated economy. However, the two systems are often interlinked and dependent on each other, for example when formal businesses are employing informal workforce. At the same time, the informal sector is by nature not regulated with little or no contribution to the formal economy in terms of taxes, fees etc. Further, the informal sector often leads to exclusion from the formal market and financial institutions, limiting economic growth, as well as, exposes unprotected and low-waged workers to additional risks.

Looking forward

Urbanisation presents opportunities to introduce innovative solutions and technologies also support a green transition. From an urban economy perspective, a circular economy promotes reuse, recycling and regeneration and can, if well planned and managed reduce pressure on natural resources and create sustainable local economic development, growth and jobs. In essence, a circular economy can address challenges in sectors like electronics, vehicles, packaging, plastics, construction and buildings, food, water and nutrients. Transitioning towards a green, urban economy requires in many situations a »paradigm shift«, including an enabling policy and regulatory environment as well as revisiting

[32] International Labour Organisation.

both governance and management frameworks. If successful, this transition can create both jobs and economic opportunities while contributing to climate action. Similar benefits can be generated by investing in green technologies, e.g. infrastructure, services, transport, housing and energy provision. A green transition will also contribute to environmental improvements, where economic and industrial activities are encouraged to reduce pollution and become more environmentally responsible.

The IIED[33] argues that larger cities encourage people and firms to specialise in particular skills, tasks and functions, leading to better and cheaper products and services. A higher level and efficiency in productivity attracts investment, fosters enterprise, fuels growth and creates jobs. The return on public investment in cities can therefore be higher than elsewhere because of economies of scale and lower transport costs in delivering services to large, dense settlements. The outcome should be a virtuous cycle of economic dynamism, higher incomes and better social infrastructure. Yet these positive effects are offset by rising congestion, overcrowding and higher costs of land and housing. This marginalises low-income groups and aggravates unequal access to jobs and amenities.

2.8 Spatial dimensions of urban sustainability

The spatial organization of our cities and urban areas is instrumental in promoting inclusive and equitable environmental, economic and social development. Cities and local authorities play a central role in ensuring that the needs emerging from rapid urbanisation and population growth – e.g. additional demands in the provision of housing, infrastructure, services, economic activities and income opportunities – can be accommodated.

The vast majority of the urban population (some 50%) live in urban areas with between 100,000 and 500,000 inhabitants.

Urbanisation takes place everywhere

Currently, only some 10% of the urban population reside in megacities, i.e. urban agglomerations with 10 million inhabitants or more. There are some 33 megacities globally, most of which are located in developing countries. At the same time the vast majority of the urban population (some 50%) live in urban areas with between 100,000 and 500,000 inhabitants. The bulk of anticipated urbanisation will take place in intermediate and secondary cities and the absence of multi-scalar and integrated approaches to territorial and urban planning – linking development needs and opportunities across a spectrum of urban centers (e.g. common housing and economic markets) – risks leaving small and medium sized cities behind.

Land use and urban density

Rapid and uncoordinated urban growth often leads to inefficient land use with urban sprawl and poorly planned areas in peripheral

[33] Rethinking urbanisation and economic development, IIED, 2023

Proper spatial planning can contribute to both climate action and enhanced urban resilience.

locations with low densities. Typically, this results in higher costs in the provision and maintenance of key infrastructure, generate longer transportation times leading to decreased productivity, while increasing the risk of exclusion from housing and job markets.

Efficient land use with an agglomeration of urban functions offers economy of scale in the provision of infrastructure, housing and services while extending the benefits of urban life to a larger population. An urban morphology with higher densities and mixed land use also has social and economic benefits. However, a balanced development is needed to ensure equitable accessibility, connectivity and access to open space, to avoid overcrowding and too high pressure on available services and health implications.

Further, rapid urban growth with increased demand for developable land tends to expand into rural, agricultural or environmentally sensitive areas, impacting on the environment and ecosystem services. Current urbanisation trends are deemed unsustainable, as land consumption outpaces growth, leading to heightened inequalities.

Adequate housing and informality

The provision of adequate and affordable housing is closely linked to planned urban development and land use, a challenge many cities and local authorities fail to properly address due to both rapid urbanisation as well as insufficient capacities and resources to meet increasing demands.

PHOTO Google maps

Spatial inequalities manifested in planned versus unplanned development.

The lack of adequate housing in suitable locations tends to result in informal settlements and slums that typically are located on unsuitable land in peripheral locations or on marginal land, often exacerbating inequalities and exclusion with reduced access to services and income opportunities. Typically, informal settlements lack inadequate structures, services and basic infrastructure causing unhealthy living conditions.

Climate action and urban resilience

Urban areas are one of the main contributors to climate change, mainly attributed to the use of resources, energy consumption, pollution and emission of greenhouse gases. The spatial organization and structure of our cities and towns, can contribute to addressing such challenges, for example in the provision and design of urban functions, infrastructure, and green areas.

Proper spatial planning can contribute to both climate action and enhanced urban resilience by limiting urban sprawl, reducing the environmental footprint, and a more efficient use of available resources in the provision of urban systems and functions. The planning, design and construction of new developments and buildings is central, where the choice of construction methods, materials and technical solutions (including their life-cycles) have implications for the climate and environment.

The spatial organization of urban areas also has an integral role in reducing exposure to potential risks and hazards from climate change, e.g. flooding, land slides etc.

Looking ahead

Spatial and urban planning provides the framework within which the urban fabric, structure and land use is spatially organized and coordinated. Urban governance and management is also key in addressing a sustainable spatial organization of urban areas to ensure equitable environmental, economic and social development. An integrated provision and distribution of urban systems and functions is central to also harness synergies, for example through enhanced proximity and accessibility. The spatial organisation, density and typologies of urban areas are key factors that inform the level of urban sustainability.

Reducing urban sprawl and the growth of informal settlements is central to tackle spatial segregation and exclusion, and where alternative solutions in the provision of affordable housing, infrastructure and services is needed, especially when availability of land is limited. This requires integrated approaches to spatial and urban planning, including land use planning, mixed-use development, compact and connected urban fabrics informed by relevant urban design standards.

PHOTO Giga Kokoladze

3.

A CONCEPTUAL MODEL FOR URBAN SUSTAINABILITY

ENVIRONMENTAL
SOCIO-CULTURAL
ECONOMIC
SPATIAL

URBANISATION is one of the twenty-first century's most transformative trends where 'the cities of today contain the answers of tomorrow'. Prosperous, inclusive, and resilient cities are essential for an economically sound, socially responsible and environmentally sustainable future.

A wider perspective is needed to address the sustainability of urban areas, which include economic, social and environmental dimensions.

3.1. Dimensions of urban sustainability

Cities and towns are often drivers for *economic, social, cultural and political development*. In some cases, they are also administrative centres. To harness the opportunities that urbanisation presents, but also to address associated challenges, a holistic, integrated and inclusive approach is needed. Sustainable urban transformation and development require proactive urban governance and management, empowered and effective institutions, innovation and targeted spatial planning processes, as well as, an efficient and equitable use of available resources. Local governments, in collaboration with others, have a key role in this regard, for example in the provision of adequate infrastructure, affordable housing and basic services across different urban scales, underpinned by productive and equitable economies. The *SymbioCity Approach* recognizes[34] the environmental, social and economic dimensions within a spatial context, as key dimensions to foster sustainable urban development.

Environmental dimensions

Environmental sustainability refers to the *protection and preservation of long-term biological and ecological systems* and processes, to guarantee sustained and enhanced biological diversity and ecosystem services. Cities and human settlements should develop in recognition of the *carrying capacity of the environment*, without negatively impacting the planetary boundaries. Environmental sustainability reverses the negative trends of *climate change, biodiversity loss and pollution (triple planetary crisis)*, and on the contrary, contributes to *enhanced urban resilience and climate action* (adaptation and mitigation).

Urban environmental sustainability implies using *energy and resources more efficiently, reducing emissions of greenhouse gases*, and increasing the resilience of urban environments to withstand expected and sudden shocks and events, including impacts from climate change. In addition, green areas and their networks,

[34] In alignment with Developing Sustainable Cities in Sweden, SKL, Ordbildarna, 2011.

public spaces, forests, urban agricultural areas and other natural resources should be developed and protected. Environmental issues and measures are especially important for cities and towns that are more exposed and vulnerable to climate change impacts, for example in areas prone to flooding and rising sea levels.

Social dimensions

Social sustainability promotes inclusive, socially cohesive and just human settlements, supported by equitable access to basic social, commercial and physical services. Particular consideration should be given to the urban poor, but also the needs of women, children, the elderly and disabled, ethnic minorities and other vulnerable or marginalized groups.

Inclusive and participatory urban planning and decision-making promotes transparency and accountability while enhancing ownership among stakeholders and beneficiaries. Social sustainability can be promoted by integrated and diverse urban areas with mixed land use functions, cultural diversity, a variety of affordable housing options, and where equal access to education and health services, schools and parks, day-care centres, recreational opportunities, public transport etc is ensured. Inclusive, gender-sensitive and pro-poor urban development is key for a socially cohesive urban environment.

Economic dimensions

Urban areas are often referred to as the engines of economic growth, job creation and well-being. Prosperity and economic sustainability require development that is in balance with available resources, that is inclusive and of benefit for all. Well-planned urban development provides opportunities for diverse economic activities, local economic development, businesses and entrepreneurship.

Figure 3.1
Centered around people, gender equality and pro-poor perspectives, the model focuses on environmental, economic and sociocultural dimensions of urban sustainability to ensure health, safety, comfort and quality of life for all inhabitants.

The spatial distribution and location of urban functions, systems and services are of fundamental importance for sustainability.

Figure 3.2
Urban sustainability has spatial and geographic implications. It concerns the urban and regional built and natural environment, the distribution and location of urban functions and the provision of services in urban systems.

Compact urban areas offer economies of scale in the provision of infrastructure, housing and basic services, making efficient use of available resources.

Local economic development can enhance the links between economic growth and job creation, contributing to improved local governance, stakeholder participation, and partnerships, for example between governmental levels, public, private and academic actors.

Circular economy can support a green transition of urban areas, through e.g. reuse and regeneration, innovation and investment in green technologies and environmentally friendly infrastructure, services and systems. Hereby, new jobs and business opportunities are created while promoting climate action and enhanced resilience. The image of a city or town is important for attracting investment and new economic initiatives, and positive perceptions are based not only on the physical features, but also against the social and economic environment.

3.2 Spatial dimensions

The spatial composition and distribution of urban systems, functions and services is critical to urban sustainability. Some urban areas develop structurally through agglomeration of settlements, while others develop around infrastructure such as public transport systems. Regardless, poorly or unplanned urbanisation tends to result in urban sprawl and inefficiency in the use of resources. *Urban morphology* therefore has a direct impact on the preconditions for urban sustainability.

Cities and towns are often complex and dynamic in nature, requiring an integrated and interdisciplinary approach overlaying environmental, social and economic dimensions to the spatial development of urban areas. Promoting *compact, connected, inclusive, vibrant and resilient*[2] urban development has various spatial implications that should be considered in urban development. A compact urban fabric relates to both the *population density* as well as *density of the built environment* (the built mass), equally important for an economy of scale in the provision of urban systems and functions. Providing *public space* that is accessible, attractive and safe, well as well as, the quality, structure and form of the built environment at large, are key aspects for any urban development intervention. Every city or town is unique with its own *culture, history, geography* and *development trajectory* informing the spatial qualities and preconditions of development.

Urbanisation most often requires more land and other resources in the provision of adequate housing, workplaces, services and infrastructure. In some cases, urban areas should not be re-

[35] My Neighbourhood, UN-Habitat, 2023.

garded as separate spatial entities, but rather as nodes or centres with a surrounding hinterland. Applying a *multi-level territorial approach*, including urban-urban or urban-rural linkages, is key when analysing, reviewing or formulating urban development strategies, plans and interventions. While some aspects have regional, national or international linkages, others might be more related to the city, city-district, neighbourhood or block.

Urban informality has in many developing countries a significant role, e.g. in the provision of shelter as well as jobs. Some critical urban functions also depend on the informal sector, e.g. waste management. Informality can manifest itself spatially in different ways, for example through the spontaneous (and temporary) use of urban spaces, the emergence of informal housing, or along streets for vending. Understanding informality in urban areas, its spatial implications and relation to formal sectors, is central to inform urban development interventions that also have a transformative impact.

3.3 A conceptual model for sustainable urban development

The conceptual model emphasises the relationships between the environmental, economic, socio-cultural and spatial dimensions of urban sustainability.

The *SymbioCity Approach* builds upon a conceptual model illustrating the relations between *environmental, economic, socio-cultural and spatial dimensions* of urban sustainability fostering *quality of life, well-being, comfort and safety*. Development of urban areas is often complex and dynamic including a multitude of intertwined issues and relationships that need to be considered. Further, every urban area is unique presenting its own characteristics and conditions for urban development. Against this backdrop, the conceptual model is generic and its application needs to be adapted to the prevailing context depending on scope and purpose of the planned intervention or activity.

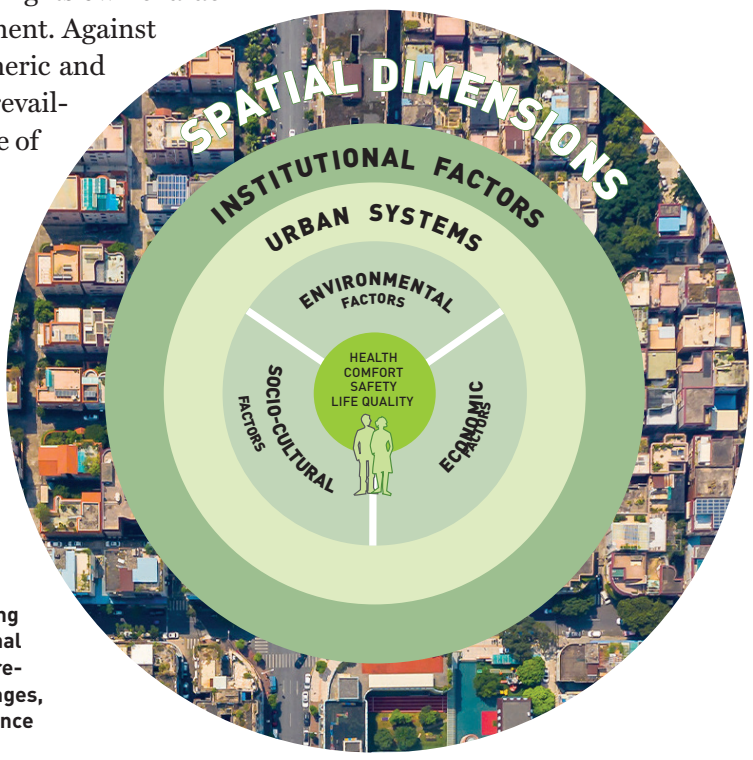


Figure 3.3
Urban systems and institutional factors are supporting drivers for achieving sustainable development. Synergies are crucial between the urban systems and structures that we use in our everyday life, such as water, energy, waste, transport and traffic, buildings and architecture, information technology, landscaping and social spaces. An effective and transparent institutional framework is essential for making processes and results sustainable. Institutional factors include management, distribution of responsibilities, and internal and external linkages, but also legislation, financing, urban governance and political leadership.

The model can be used to support e.g. *urban sustainability reviews* (USRs), the development of *strategies and plans, or specific urban transformative projects* and interventions. Central to the conceptual model is the identification of both challenges and opportunities, and harnessing the potential synergies between various urban systems and functions. Hereby, the model aims to result in interventions and actions that have a *transformative impact* on urban development.

The conceptual model is applicable on *different territorial levels*, from neighbourhoods to city-wide, while also useful in analysing metropolitan and regional relationships, e.g. urban-rural linkages. Although the model promotes a holistic and integrated approach, it can also provide guidance in sectoral analysis and planning.

Understanding the context, its past and present, is essential to inform the development of relevant responses to identified urban challenges. Forward-looking *visions, scenarios and strategies* can help define the way forward, supported by required technical and financial resources, governance structures, regulatory frameworks and policies for implementation. The time dimension is therefore also of importance.

»If we can build a successful city for children, we will have a successful city for all people.«

Enrique Peñalosa

Unpacking the Conceptual Model

The inner core of the conceptual model refers to the integrated and inclusive approach of SymbioCity to urban development, with the ultimate goal to ensure the *quality of life, well-being, comfort and improving living standard and safety* for all. Adopting human-centric design and value-based principles is central to foster equitable opportunities for every-day urban life, and for stakeholders, communities and people to take owner- and stewardship of development outcomes. Cities are for everyone (men, women, girls and boys) and inclusive development ensures gender equality, pro-poor perspectives and that the needs of vulnerable groups are accounted for.

The **first circle** represents the *environmental, economic and socio-cultural dimensions* of urban sustainability. The three dimensions are in most instances interrelated, also linking to both institutional factors and urban systems. For example, when planning a new public transport system the design of the system will depend on the financial resources needed and available for its construction and operation (*economic dimension*). Furthermore, the system most likely targets various user groups (*socio-cultural*) and has a positive environmental impact by decreasing private car use while reducing emissions and noise pollution (*environmental*).

[36] Sida (2006) Fighting Poverty in an Urban World – Support to Urban Development (Policy).

The **second circle** represents *urban systems* - for example the provision of water, energy, waste, mobility and transport, buildings and architecture, ICT, and landscape & public space. *Urban functions* and structures is part of the urban systems and include functions that are used on everyday basis, e.g. housing, workplaces, social and commercial amenities etc.

The **third circle** represents *institutional systems* and factors that have direct or indirect influence on how sustainable urban development can be realised. They are broadly defined, and include e.g. urban governance and management; the administrative system for urban planning and land management; legal frameworks and systems for decision making; financing for development; cooperation between various actors and stakeholders; inclusive and participatory processes, including institutional strengthening, training and capacity building.

The **fourth circle** represents the *spatial and physical context* within which an intervention takes place, e.g. regional, city-wide, district, neighbourhood, block, topography, density and urban form etc. The spatial organization, structure and form of urban areas and the built environment, including integration with the natural environment, is critical for urban sustainability.

The time dimension has different interpretations. Firstly, the model should be applied to understand the *past and present* situation (causes and roots to emerging challenges) to better inform *future situations*. Secondly, applying the *SymbioCity Approach* can result in actions and recommendations to be implemented in *phases*, i.e. *the short, medium and long term*, also depending on urgency, availability of resources, technological solutions etc. Thirdly, the process of arriving at proposals within the *SymbioCity Approach* builds upon a *working procedure* with a series of iterative steps.

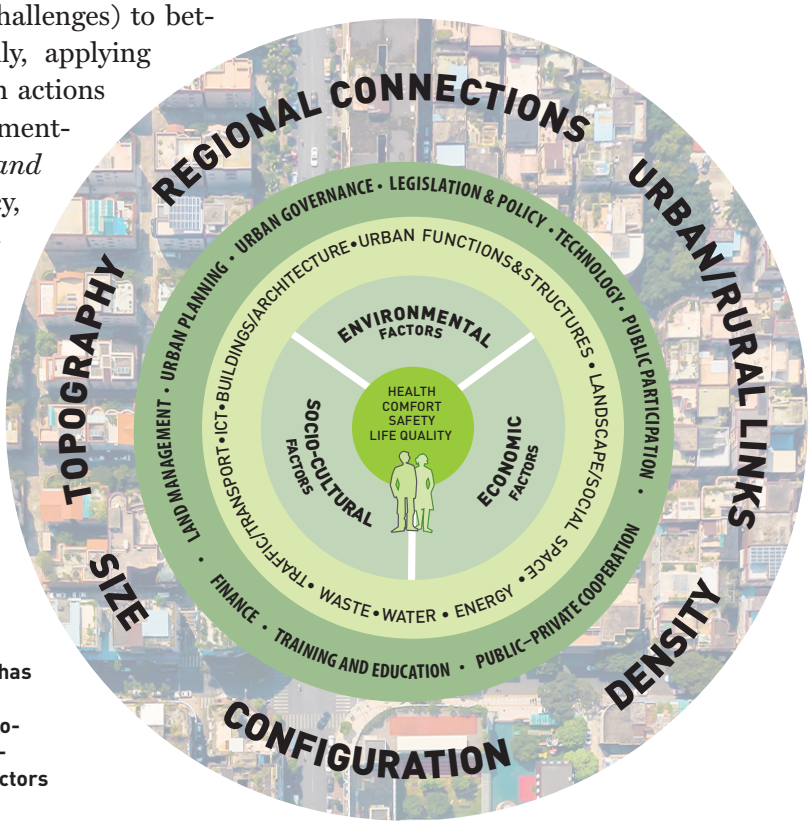


Figure 3.4
The SymbioCity conceptual model for an integrated and holistic approach to sustainable urban development. The model has people-centred urban development as its core, based on environmental, socio-cultural and economic sustainability supported by urban systems, institutional factors and spatial dimensions.

PHOTO Klas Goth

4.

INSTITUTIONAL FACTORS

URBAN GOVERNANCE LEGISLATION SPATIAL PLANNING PUBLIC PARTICIPATION FINANCING

Urban governance involves the management and administration of cities and towns, and the financial, technical, organisational, and human resources necessary for sustainable urban development.

AN EFFECTIVE INSTITUTIONAL FRAMEWORK provides the foundation to advance and accelerate action towards urban sustainability, including aspects such as:

- Effective urban governance and management, with strong institutional and technical capacities, adequate organisational and decision-making structures, and transparency and accountability;
- An enabling environment with supporting legislation, policies and by-laws;
- Frameworks for spatial and urban planning and design, including land management;
- Participatory and inclusive processes led by e.g. local governments or communities, engagement of stakeholders, and effective public information and communication;
- Availability of financial resources and incentives;
- Collaboration, cooperation and partnerships among e.g. public and private sector, academia and civil society.

The institutional factors are in many instances interlinked and can help create an enabling environment and inform pathways towards urban transformation and sustainable development. For institutions to function properly, there is a need for a certain degree of decentralisation and local autonomy in decision-making, planning and resource allocation.

4.1 Urban governance and capacity building

Good urban governance is fundamental to the management and administration of urban areas, where local to national government institutions are empowered to drive development and sustainable urbanisation. Typically, good urban governance concerns the efficient and appropriate use of financial, technical, and human resources, as well as ensuring that institutions are capacitated and organised in response to existing and upcoming needs.

Principles of good governance

While there are different definitions of governance, which tend to vary over time and depending on context, there are guiding principles that are universal. For example, UN-Habitat points at good urban governance as »the different ways in which public and private institutions and individuals participate in the planning,

design and management of the common affairs of a city, and the processes used for effectively realising the short- and long-term agenda of a city's development«[37] . This suggests adhering to key governance principles such as environmentally friendly, participatory, accountable, transparent, effective, equitable and inclusive, both in law and in practice.

The *New Urban Agenda* points at governance as a key driver of change, in which new forms of partnership between governments, communities, civil society and the private sector can be promoted.

KEY FACTS

THE NEW URBAN AGENDA ILLUSTRATED [38]

The New Urban Agenda illustrated outlines five distinct principles:

Accountable decision-making: public institutions should promote an open and transparent decision-making process, including mechanisms to report public misconduct.

Participation and inclusivity: all stakeholders should be involved in public decision-making.

Subsidiarity and proportionality: Legal frameworks should empower local and sub-national authorities fiscal and jurisdictional autonomy to carry out urban functions and service delivery.

Cooperation and efficiency: Local authorities should cooperate and establish inter-municipal institutional arrangements for joint decision-making, service provision and public investment.

Digitalisation and knowledge management: While utilizing e-governance tools, governments should ensure that the data collected promotes social inclusion in the decision itself and outcomes.

In essence, good urban governance means that decision-makers should be accountable for their actions to the public, where transparency demonstrates that available resources are used in an efficient manner and where decisions are made for the public good. By involving the people and stakeholder groups, urban development interventions can be responsive to real needs of local communities, where in a sense, good governance can be regarded as establishing »social contracts«. In ensuring inclusive approaches, the needs and voices of different segments of society can be heard, including the urban poor, women, youth, minorities and other marginalized groups, leading to a more equitable distribution of voice, economic opportunities and services.

Distribution of roles and responsibilities

Local urban governance is also influenced by modalities and the *degree of decentralisation*, in simple terms the mandates and pow-

[37] Strategic Plan, 2020-2023, UN-Habitat, page 59.
[38] United Nations Human Settlements Programme (UN-Habitat), 2020.

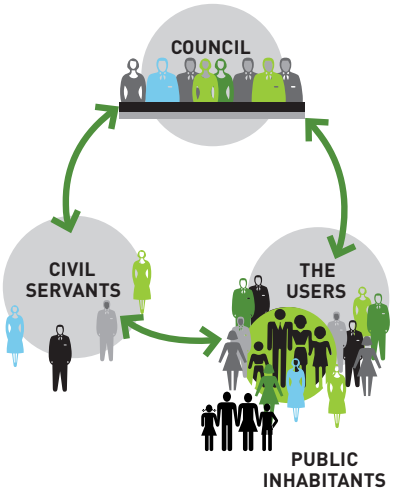


Figure 4.1
The roles and interaction between different stakeholders is key in an urban development process.

Cooperation between metropolitan units is characterised by degrees of formality.

ers that are devolved to local governments. An increase in local self-governance requires strengthening of institutional and technical capacities, ensuring fiscal autonomy and access to financing, while establishing viable modalities for engagement and participation of the public and other stakeholders.

Decentralisation implies bringing decision-making closer to the beneficiaries, e.g. communities and other stakeholders, which in turn require open and inclusive modalities and processes for engagement and participation. *Democratic institutions* are prerequisites for involving communities and interest groups in urban planning and environmental improvements. Effective representation by elected local representatives is an essential starting point for democratic local governance.

Democratic governance also requires participation and consensus building among stakeholders, for example within and between municipalities as well as between the public and private sectors. Responsibility for decision making and management of resources should ideally be decentralised to local authorities empowering them to be responsive to local development needs and environmental conditions.

Accountability and transparency, including monitoring and reporting

Transparency and accountability are key to good urban governance, and cut across all areas of engagement. Availing information on public affairs increases insight in the governance and management of local authorities, including how budgets are planned and spent. Transparency also helps reduce fraud and misuse of public finances.

Patronage, nepotism and corruption are often significant factors contributing to inefficiencies in urban governance, posing obstacles to promoting shared prosperity and addressing extreme poverty. Typically, it increases costs, reduces access to adequate services (health, education, justice) and erodes trust in government while undermining the social contract. For example, corruption in public procurement can lead to exacerbated environmental degradation and biodiversity loss, choice of second-best technologies, cover-up of emissions and pollution, excessive abstraction of water, and illegal dumping and use of hazardous and other waste. Corruption also harms transparency, as corrupt individuals have a vested interest in avoiding exposure. Awareness raising and training are examples of interventions that can counteract corruption, while also contributing to more robust urban governance and general capacity building.

In addition, good urban governance implies that performance and progress is monitored and reported upon[3], e.g. through professional auditing and systems for reporting progress as well as set-backs. Such monitoring typically includes assessments of performance against set targets in service delivery, but also the use

[39] Tannerfeldt, G & Ljung, P (2006), More Urban Less Poor – an introduction to Urban Development and Management.

of financial and other resources. From an Agenda 2030 perspective, and implementation of the Sustainable Development Goals, member states can submit their *Voluntary National Reviews* (VNRs) which demonstrate progress made in delivering upon the SDGs. Similarly, cities and local authorities can prepare *Local Voluntary Reviews* (VLRs), which also is a modality for exchange and peer learning.

Vertical and horizontal collaboration and co-ordination across traditional boundaries promote integrated approaches to development.

Institutional cooperation and coordination

Institutional structures should encourage multi- and transdisciplinary collaboration across traditional boundaries ('silo organisations'), to overcome barriers between functions and where incentives are introduced towards integrated approaches of working. This requires *political will and leadership* from management levels, and *adequate professional and technical capacities* to make appropriate decisions and implement actions towards sustainable urban development.

In rapidly urbanising or large metropolitan contexts, development and growth often take place beyond traditional municipal jurisdictions. Besides local and metropolitan authorities, national and regional governments and other state agencies, are usually involved in urban governance, management and planning. This calls for enhanced horizontal and vertical *collaboration and coordination*, also including civil society, communities and other urban stakeholders, to ensure that urban development is properly governed, planned and managed according to laws and regulations, especially when multiple jurisdictions are covered.

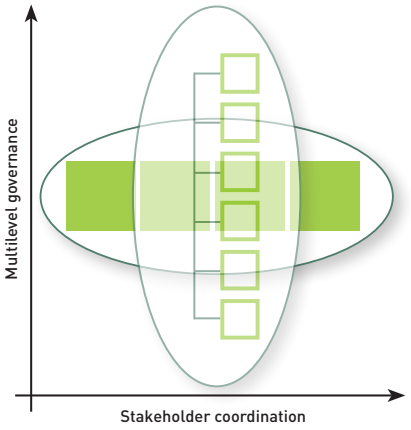


Figure 4.2
Coordination of service delivery across levels of government and metropolitan areas.

Institutional cooperation and coordination is dependent on the governance system in place, the *degree and level of centralization* of urban responsibilities, and aspects of formality in the relationships between people, departments and agencies. Ultimately and ideally, urban governance should enable access to urban services (and goods) not compromised by jurisdictional barriers, providing a balanced development across the territory, including housing, services, health, education etc.

Figure 4.3
Example of actors engaged in an urban development process.

Urban governance in a digital era

Following technological advancements and a higher degree of access to digital tools, e-governance can be an effective way to provide services and engage citizens and stakeholders in development processes. The rapidly increasing generation, availability and use of data is generally positive. However, decision-making must ensure that data is reliable, accurate, and protected. Information and data must be desegregating, e.g. gender- and age-sensitive, to ensure social inclusion in decision-making itself and the outcomes. The range of sources that can avail data

of relevance for analysis, modelling and planning of urban development is continuously increasing, from traditional census and statistical databases to satellite imagery, real-time data from sensors and mobile phones. Attached to the management and use of data comes data security concerns and vulnerability. Systems can be hacked, crash or be exposed to viruses, but data can also be sensitive from an individual perspective. Legal frameworks and policies need to be in place for adequate data protection and management, safeguarding the individuals' rights.

The availability of urban data is a tremendous resource, which can be used for analysis and diagnosis of urban areas, but also to understand trends and inform forward-looking scenarios. Managing such data is critical, and several modalities exist to support data gathering, monitoring and dissemination, e.g. urban observatories, information systems, think tanks etc. In many ways, availability of data allows for urban governance and management to be informed, evidence-based and efficient.

KEY TAKEAWAYS

- Transparent and accountable urban governance makes efficient and appropriate use of available financial, technical, and human resources for the public good.
- Corruption and misuse of funds undermine institutions and pose obstacles to shared prosperity, limits service delivery and exacerbates environmental degradation.
- Local urban governance is influenced by the degree of decentralization, i.e. the distribution of mandates, powers and autonomy bringing decision-making closer to the beneficiaries.
- Vertical and horizontal collaboration and coordination across traditional boundaries promote integrated approaches to development.
- The availability of urban data provides evidence for informed decision-making.

PHOTO Ordbildarna

Experts meet on-site to consult on progress, Kimberley, South Africa.

4.2 Policies and legislation

Legislation and policy frameworks are powerful instruments for creating an enabling environment to promote development and enforcement of transformative interventions, strategies and plans. Urban planning and environmental legislation (e.g. Urban Planning and Environmental Acts) are typically national frameworks establishing objectives, planning and building codes, environmental standards, etc., which regulate and guide urban development at local level. However, urban development is also informed by and needs to comply with other legislation, for example on cultural heritage, waste and water, administration of land and prop-

erties, municipal finance, local governance, public procurement etc. While urban planning and environmental legislation should establish minimum requirements and standards to ensure both sustainability and »make no harm«, they also need to support development by offering flexibility and allow for adaptation to local conditions and needs. Interpretation and application of national legislative frameworks through local policies and standards are often referred to as »by-laws«.

The alignment of national, regional and local legislation and policies is essential to ensure common standards and practices, decentralisation of responsibilities, as well as stimulating cooperation and coordination among governmental entities, horizontally and vertically. A cohesive legislative and policy framework helps address potential barriers or contradicting interests in achieving a particular goal. For example, efficient and enhanced service provision can be promoted by compact and higher densities of the built environment. This might be in contradiction to a goal of providing large green areas in the same area. Such potential conflicts are normally addressed through urban planning and design solutions, to ensure both objectives are met without compromising the quality of the built environment and well-being of people. Alternative development *scenarios and solutions* should be explored to acquire a good understanding of benefits, trade-offs and potential impacts of different solutions, to arrive at balanced and informed decisions. Strategic Impact Assessments (SEAs) or *Environmental Impacts Assessments* (EIAs), often required by law, are useful instruments to support this.

All residents should have access to all aspects of basic, decent living conditions such as housing, transportation, education, recreation, communication, culture, religion, employment and the judiciary, among others.

Legislation related to urban development should require the engagement and participation of stakeholders and communities in the planning and decision-making process to balance different development needs. This contributes to inclusive and prosperous cities that provide opportunities and support for all to benefit from urbanisation, including disadvantaged and marginalized groups. All residents should have »*access to all aspects of basic, decent living conditions such as housing, transportation, education, recreation, communication, culture, religion, employment and the judiciary, among others*[40]«.

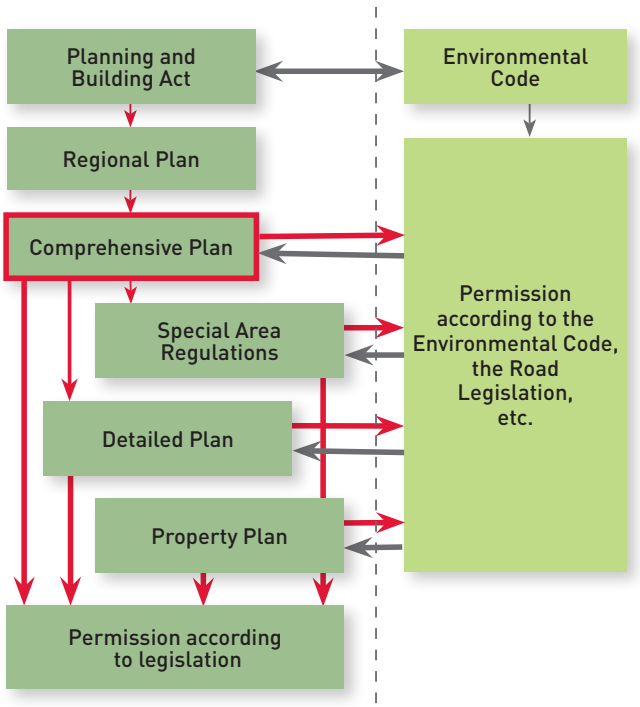


Figure 4.4
Overview of the Swedish Planning System, illustrating the links between the Planning and Building Act and the Environmental Code.

[40] UN-Habitat, 2008b.

KEY TAKEAWAYS

- Urban planning and environmental legislation are typically national frameworks establishing objectives, planning and building codes, environmental standards etc.
- Legislation and policies need to support sustainable development by offering flexibility and allow for adaptation to local conditions when needed, for example through ordinances, decrees or by-laws.
- A cohesive legislative and policy framework helps address potential barriers or contradicting interests in achieving a particular goal.
- Legislation and policy frameworks ideally contribute to an enabling environment promoting integrated approaches to urban development.
- Urban planning legislation can support the coordination of different interests and functions related to urban development, e.g. land use.

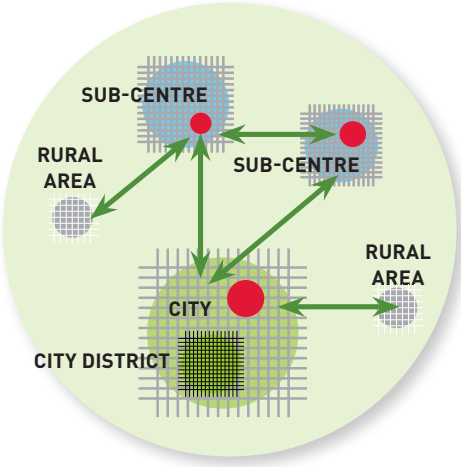


Figure 4.5
Multi-scalar approaches to spatial planning can help identify sustainable solutions and synergies.

4.3 Spatial planning and land management

Spatial and urban planning is instrumental to inform the governance and management of territories and urban areas. Spatial planning is often referred to as *territorial or regional planning* when applied in a larger geographical context e.g. involving multiple local authorities, while *urban planning* (comprehensive planning, master planning, detailed physical/development planning) normally refers to metropolitan and urban areas. Spatial planning is the organization, coordination and use of the physical and natural environment over time, including all types of land use, natural resources and the urban fabric. The *SymbioCity Approach* applies the term spatial planning to stress the importance of an integrated approach where also the urban-rural continuum is considered.

Ideally, spatial planning is a local responsibility where a holistic and integrated approach to urban development implies linking different urban scales of interventions. For example, strategic decisions and planning on a territorial level most often influence actions and solutions on a very local level, while the opposite occurs where local solutions can be *scaled up and replicated* on a city or territorial level. This multi-level, or multi-scalar, approach to spatial and urban planning can help understand *urban dynamics* but also in identifying *sustainable solutions and synergies* between different urban systems.

An integrated approach to spatial planning involves the coordination and integration of urban systems, such as land use, provision of infrastructure and services, public space and green areas. Similarly, planning of *urban areas and its hinterland (urban-rural linkages)* helps identify interrelationships and pro-

mote synergies. For example, reducing the ecological footprint of an urban area can be achieved by using organic waste as fertiliser for agricultural production, or be used to extract biogas (energy generation).

Following rapid urbanisation and expansion of urban areas, there is an increasing need for planning on a territorial (regional) level to understand the economic, social and environmental dynamics. A well-balanced, integrated and connected hierarchy of urban centres can help distribute and share the pressure of e.g. housing and service provision, job opportunities and economic development. *Intermediate and secondary cities* can function as growth nodes that enable clustering of services, facilities and infrastructure, also providing markets for agricultural products. Spatial and urban planning is equally important in contexts experiencing shrinking populations or declining economic activities, for example by repurposing land use, adapting distribution of services, or regeneration of the built environment etc.

A spatial plan (territorial or urban) guides short and long-term development and *supports decision-making and governance* of both land use and development of the built environment. The plan should be informed by a *long-term vision* illustrating how the city can respond to environmental, social and economic needs, including provision of housing, infrastructure, investment opportunities and environmental improvement. It provides a framework that guides *detailed development planning* for particular districts, areas or neighbourhoods, e.g. by regulating land use and building rights. Detailed development plans guide *building permissions* and control. *Urban design principles and guidelines* attached to detailed plans are useful to ensure a high-level quality of the development, but also for awareness raising and communication purposes, e.g. when engaging with communities and stakeholders.

Spatial planning provides a framework to identify synergies between different urban systems and functions, to harness *environmental, social and economic benefits*. An integrated approach implies the engagement of different sectors (public and private), institutions and organisations allowing different professional and sector perspectives to be represented [41]. This is equally important within administrations to disrupt internal silos. A common and joint understanding of the role of spatial planning is therefore also important.

In promoting an integrated approach, spatial plans should be linked to funding options, e.g. municipal budgets, to ensure that strategies, priorities and plans can be implemented. For example, spatially informed *Capital Investment Plans (CIPs)*, outline investment priorities and the costs of various interventions and can be used to inform the municipal budget which also should include costs for maintenance and operations.

Territorial and urban plans guides informed decisions on development and investments in both the short and long term.

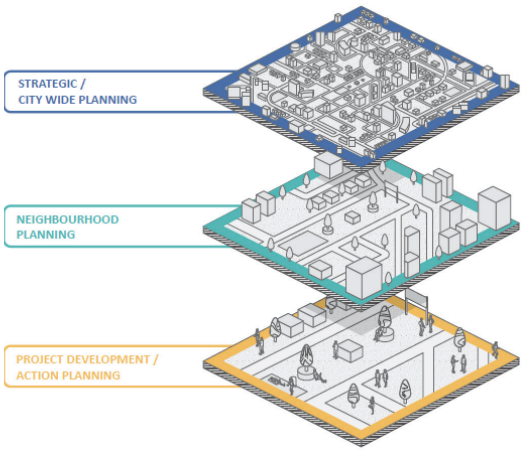


Figure 4.6
Integrated planning addresses development on multiple urban scales.

[41] Tornberg, P (2011), Making Sense of Integrated planning, Doctoral Thesis in Planning and Decision Analysis, with specialization in urban and Regional Studies, Stockholm.

Reviewing spatial plans on a regular basis ensures that the plan is up-to-date in response to contextual changes or developments, hence, an opportunity to revisit or complement emerging issues. This process requires participation and dialogue with stakeholders, e.g. citizens, landowners, public and private companies, civic organisations, etc, and can also serve as *a communications platform* to strengthen participation and collaboration. A well-formulated spatial plan builds upon an inclusive and participatory process and is the basis for *efficient, integrated and inclusive* urban development.

The *interplay* between the vision and strategies in a *spatial (or urban) plan* on the one hand, and active *management of land* on the other, can create synergies and unlock development potential for example in the provision of services, infrastructure and affordable housing, as well as, stimulate economic development and safeguard environmental values. A close coordination between urban planning and land management systems is thus a requirement.

KEY TAKEAWAYS

- Spatial planning is an effective instrument for organizing and coordinating the use of the physical and natural environment, including all types of land use, natural resources and the urban-rural continuum.
- Multi-scalar approaches to spatial and urban planning promote integrated solutions including identification of synergies between different urban systems.
- Urban plans must inform municipal budgeting and needs for investments, including operations and maintenance.
- Pro-active urban planning and land management should be linked, also to address the needs of the urban poor and other vulnerable groups.
- Urban planning typically adopts a growth-oriented perspective, but it is equally important in contexts of shrinking populations and economic decline.

4.4 Inclusive processes

The practice of effective and meaningful public participation should be institutionalized through legal requirements and by cultural forms of engagement. Such a deliberate approach can help address barriers, frictions and misperceptions, and rather build trust between decision-making bodies, stakeholders, communities and beneficiaries. The *SymbioCity Approach* emphasizes participation and communication as essential means to realise:

> **Human rights** – citizens have the right to be consulted on

decisions that affect their lives, and to be informed about the basis for decisions.

- **Democracy** – Transparency and clear communication are essential if citizens are to hold their representatives and leaders accountable for their decisions. Participation closes the gap between citizens and government institutions.
- **Effectiveness and responsiveness** – When citizens and other stakeholders are actively engaged in urban development, plans and projects will be better and more responsive to their real needs.

Meaningful participation requires the identification and engagement of relevant and affected stakeholders who either have an interest or will be directly or indirectly impacted by an intervention. Typically, urban stakeholders are heterogeneous including groups with different cultural, social or economic backgrounds. This may also be the case for communities, which sometimes are problematic to clearly define.

Bottom-up approaches acknowledge local values and create spaces that prioritise the needs of residents, based on their knowledge, social networks and aspirations, fostering social capital and resilience towards more inclusive and sustainable urban environments. Such community-led urban development typically builds upon a close collaboration and partnership between different entities, including the community, local governments, NGOs and businesses.

EXAMPLE

IMPROVING HOUSING THROUGH COMMUNITY-LED INITIATIVES

In Bolivia, the women-led federation Tejiendo Cuidades (Weaving Cities) was set up to provide low-interest loans for saving group members to secure tenure, improve lives and livelihoods. In 2017, the federation consisted of 32 groups in 3 cities and towns gathering some 500 participants and primarily collaborated with neighbourhood boards and other grassroot communities. By extending short-term loans, typically in the range of USD 150–300, slum dwellers could initiate upgrading of houses, securing tenure, improve basic services, and for equipment. The federation has improved the homes of 385 households, including land regularisation and legal action, and contributes to enhanced city resilience by increasing access to safe and affordable housing, reducing human vulnerability and building community cohesion and networks.

Source: Slum Dwellers International (SDI), https://sdinet.org/

EXAMPLE

PROMOTING PARTICIPATORY, RESILIENT AND INCLUSIVE URBAN PLANNING IN JORDAN

During 2024–2025, SALAR International implemented a regional capacity development programme (INLOG) for local governance stakeholders in Algeria, Jordan, Libya, Morocco, and Syria. Besides the regional programme activities which also included numerous sessions on the SymbioCity Approach, in-country groups implemented their own country specific sub-projects. In Jordan, the team developed a guide named »Participatory, proactive and resilient local urban planning« designed to support municipalities in adopting participatory and resilient urban planning practices through a clear, step-by-step methodology. It consists of six main steps inspired by SymbioCity and was tested with three Jordanian municipalities, generating actionable recommendations and case studies that was incorporated before finalization to enhance applicability for Jordanian conditions.

The Greater Karak Municipality, supported by its Urban Development and GIS Lab, has taken on the role to serve as a hub for city-to-city knowledge sharing, enabling horizontal cooperation, strengthening institutional capacity, and creating a foundation for scaling lessons across governorates and into the wider region. The guide strongly aligns and contributes to implementation of the Jordan National Urban Policy (JNUP).

Different modalities and levels of participation can be considered depending on the purpose and when in the process participation is activated, including:

- **Sharing information** in the initial stages, to establish contact and increase awareness;
- **Consultation** when proposals are presented, and stakeholders submit comments;
- **Participation**, when alternatives are considered, and active inputs are expected;
- **Collaboration**, when stakeholders contribute actively to the planning process, implementation and operations with time and/or other resources;
- **Mobilisation**, when stakeholders are encouraged to participate, e.g. during implementation, and operations and maintenance.
- **Empower**, when power and responsibility for decision-making is shared between stakeholders.
- **Community led**, when specific development projects are initiated and managed by civil actors.

Raising awareness among stakeholders is essential and often a pre-requisite to promote a meaningful engagement. Campaigns can be launched for awareness raising on urban sustainability in general, on specific topics (e.g. waste management), or in relation to a particular development initiative. Such communication is typically the responsibility of local authorities, but other institutions with specific expertise on awareness and communication can be involved.

Awareness raising is the starting point for participation where the quality of the outcomes normally is informed by the

The City of Stockholm invites the public to take part of urban development initiatives (Stockholmsrummet).

Source
https://nyatunnelbanan.se/nyheter/stockholmsrummet-oppnar-utstallning-om-infrastruktur/

level of openness and transparency. The benefits of ensuring an inclusive and participatory process include:

- strengthened local democracy and decision-making;
- increased transparency and effectiveness;
- a more informed understanding of citizens' priorities and needs;
- bringing the collective knowledge, experience and perspectives of different people »to the table«;
- increased awareness among citizens on the municipality's vision, goals and services;
- increased participation in local elections;
- increased contribution by citizens and other stakeholders to local development.

There are several modalities for the engagement of stakeholders in development and planning processes, which also depend on the purpose, scope, expected outcomes and available resources. Traditional methods include *planning forums, thematic workshops or co-creating Open Space Technology* (»active« engagement) *but also seminars, open public meetings or hearings* (»passive« engagement). When appropriate, site visits and *walking tours* are useful to also acquire a good understanding of the physical environment and the needs of communities.

Various digital technologies and tools are widely accessible and used to gather and analyse information and data, and can be commonly used to communicate information that previously was only available to experts and officials. Digital tools are also useful for *visualizing and communicating* concepts, ideas and possible solutions, and thereby facilitate interaction between communities, residents and the government. Although digital platforms and tools contribute positively to inclusion and participation, there are risks of segments of society being excluded due to illiteracy or with less or no access to computers, smart phones or internet. *Websites and social media platforms* are effective ways of both communicating and sharing information, as well as being a modality to gather input, comments and feedback on e.g. planning proposals. Mass media, e.g. radio, TV, and social media can be used if relevant to the context, used both for disseminating information and inviting stakeholders to a public debate.

Combining different modalities for enhanced engagement and participation should be considered, depending on context, purpose and availability of resources, where each modality has its own advantages.

The establishment of information and communications venues in the areas concerned is useful, especially for larger and more long-term development initiatives. Such venues can offer access to general information while hosting meetings and workshops, and where proposals and plans are exhibited and discussed with

EXAMPLE

DIGITAL TOOLS FOR COMMUNITY PARTICIPATION

The Block By Block initiative, a collaboration between UN-Habitat and Mojang, applied Minecraft (video game) to catalyze both governance and civic engagement in the provision of public space. Communities, people of all ages, backgrounds and education levels, are invited to co-create and three-dimensionally, visualize aspirations and ideas, driving consensus and for decisions to be well-informed, later translated into actual, implementable improvements of neighbourhoods and places.

New skateboard park in Pristina, Kosovo as a result from inclusive planning using Minecraft.
Source: www.blockbyblock.org

Civil society's role in environmental planning should be strengthened via participatory decision-making processes, methods of judicial appeal and access to good quality environmental information.

residents and other stakeholders. This could be accommodated in existing public facilities (e.g. a municipal office or library) or temporary facilities established for this specific purpose.

Regardless of modality to engage stakeholders in participatory processes, documenting both the process and received input is critical to enhance transparency and building trust. Sometimes comments or suggestions cannot be accommodated, for which documentation and justification is equally important.

From the outset, it is important to create a common understanding and define the framework, purpose and limitations of a particular intervention, to inform a targeted and meaningful engagement and participation of stakeholders while establishing expectations. Similarly, when final decisions e.g. on a planning project might not be appreciated by some stakeholders, communicating opportunities and procedures to appeal is important.

KEY TAKEAWAYS

- Public participation contributes to buy-in and local ownership, while enhancing transparency, accountability and effectiveness.
- Local knowledge and values are key to inform relevant responses to urban development challenges and needs.
- Participation and engagement look different, depending on context, purpose and when in the planning process it takes place, ranging from communication, to consultation and mobilisation.
- Participation, engagement and communication should be adapted to the target group/s, as urban stakeholders typically are heterogenous, with different social, cultural and economic backgrounds and needs.
- Different approaches and tools for meaningful participation can be applied depending on target groups and purpose.

Youth engagement in urban visioning process, SymbioCity Colombia.

4.5 Building partnerships

Rapid urbanisation and global challenges call for an acceleration in efforts to address emerging environmental, social and economic challenges, not least climate change. Cooperation and partnerships among urban stakeholders play a key role, also in job creation and stimulating economic growth. While different levels of government are equipped to address these challenges, there is a need to accelerate action on the ground that requires a paradigm shift moving from »business as usual« to innovative approaches and solutions.

Cooperation and collaboration between public and private sector entities can help speed up execution of identified and agreed actions, while also leveraging respective areas of specialized

expertise and skills. Although modalities for partnerships and private sector engagement vary across contexts, there are benefits in sharing risks and leveraging access to financial resources for investment. *Public-Private-Partnerships* or *Special Purpose Vehicles* are common modalities for partnerships between public and private sector. Typically, the governmental entity (at appropriate level) would be responsible for the alignment of the partnership to existing regulatory and policy frameworks to ensure an enabling environment. If successful, partnerships between the public and private sector can improve service delivery, accelerate the provision of infrastructure and housing, and introduce innovative solutions while contributing to climate action.

Properly planned urban development can attract the establishment of various businesses that contribute to economic development and growth, create job opportunities, and stimulate entrepreneurship and innovation. Urban development and transformation interventions should build upon *continuous cooperation* between local authorities and the business community, including small and medium-sized enterprises, ensuring that different needs are met but also to encourage further investments. Private sector involvement in service provision can range from multinational companies managing water and sanitation facilities, to poor city dwellers earning a living from recycling waste [42].

The private sector can also play a central role in promoting a *circular economy* and reduction in GHG emissions, for example by introducing *green technologies* in sectors such as energy, digital solutions and infrastructure provision. Private sector businesses adhering to *principles of sustainability* and with expertise in areas e.g. renewable energy, transportation, logistics, water and waste management, construction and infrastructure, can support reducing the ecological footprint, GHG emissions and pollution.

Building partnerships, for example between public, private and academic sectors, can help catalyse economic development and growth.

[42] Experience from public-private partnerships in this field is discussed in Tannerfeldt & Ljung, page 115–122.

Collaboration and cooperation between the public and private sectors need to build upon principles of transparency, clear regulations and procedures (e.g. in procurement processes or operations), and a justified value-for-money assessment. To ensure that public resources are well invested, public-private partnerships need to be competitive, sustained across political cycles and their performance continuously monitored. Outsourcing might otherwise lead to fragmentation and sub-optimization, e.g. in service delivery.

Public and private partnerships can also be extended to include academia which can contribute to innovation, knowledge generation and institutional strengthening and capacity building.

KEY TAKEAWAYS

- Partnerships can leverage available expertise, skills and access to funding opportunities, and thereby accelerate service delivery e.g. in the provision of housing and infrastructure.
- Collaboration and cooperation between public and private sectors need to build upon principles of transparency, clear regulations and procedures (e.g. in procurement processes or operations), and a justified value-for-money assessment.
- Successful partnerships are supported by an enabling legislative and policy environment.
- Partnerships and collaboration can promote economic growth, support local economic development, and contribute in the transition to a green and circular economy.
- Public-private partnerships need to sustain political cycles, be competitive and continuously monitored, to ensure public resources are well invested and to avoid fragmentation and sub-optimisation.

PHOTO: Regional Development Center

Partnerships can be established in different forms, both formal and informal. Here partners engage during a »walk and talk« session in Georgia.

4.6 Financing urban development

The need for sustainable financing of urban development, in particular for infrastructure, housing and service provision, is ever increasing following rapid urbanisation.

In many cases, local governments do not have the ability nor capacity to fully raise the necessary finances, especially in developing countries where the investment need is higher compared to developed contexts. According to UN-Habitat[43], the average annual own source revenue per capita differs significantly between local governments, from USD 12 in low-income countries to USD 2,944 in high income countries. The lack of resources emphasises the need to prioritise among investments. For example, by investing in relevant infrastructure, a multiplier effect can be achieved

[43] Unlocking the Potential of Cities: Financing Sustainable Urban Development, UN-Habitat, 2023.

and estimates suggest that by increasing spending on e.g. infrastructure by 0,5% of GDP can raise 1% of GDP, due to for example increased productivity, connectivity and well-being.

Access to financing

Access to financing is influenced by the enabling environment including governance, legislative and institutional aspects. According to UN-Habitat (2023), having clear *legal and regulatory systems* in place helps authorise and govern subnational and local government borrowing, e.g. related to land markets and property systems. Relevant *institutions* need to be equipped with the *right skills and capacities* to structure and enforce financing instruments and to extend investment opportunities to external parties, e.g. private sector. This implies government to be effectively coordinated with clear responsibilities and mandates, also informing accountability and predictability. Demonstrating *creditworthiness* among cities (local authorities) can help attract financing from capital markets, the private sector etc, hence, local governments need the capacity to plan and manage large capital projects and manage fluctuations in the financing market (currency exchange, interest rates etc). Finally, willingness to extend financing and investment is informed by the *fiscal environment*, e.g. systems to manage and monitor spending levels, tax rates and liabilities.

»Whatever the particular investment, the concept is the same: raise productivity above subsistence in order to trigger a self-sustaining process of economic growth.«

Jeffrey Sachs

The generally weak position among local authorities to raise finances by themselves and invest in key areas e.g. infrastructure, housing and services, calls for innovation and access to a diverse range of financing modalities and instruments.

Empowering local governments to raise resources can improve overall financial capacity, enhance efficiency, lower business cost and increase transparency, thus attracting capital for improved service delivery. Improved *own source revenue*, including *local taxes and user fees and charges*, increases revenue in absolute numbers, but also in improving *fiscal autonomy*, allowing for a local management of public finances responding to local economies and service delivery. Land is in many instances the most valuable resource of a local authority, and *land value capture* is an important mechanism for local revenue generation, including e.g. land taxation, levies, land pooling and readjustment, sales of development rights, user fees etc. Financing modalities can also include *pooled financing* (e.g. two or more local authorities), *blended financing* (e.g. public and private) to enhance and attract financing while also sharing risks for e.g. larger infrastructure investments.

Cities and local authorities, especially in low- and middle-income countries, typically remain dependent on *intergovernmental transfers*, i.e. loans or grants from national or regional governments to support investment in infrastructure and service

delivery. Such transfers can both be conditional (earmarked for a specific purpose) or unconditional (general revenue sharing). Further, *multi-lateral development banks* (MDBs) e.g. the World Bank, International Monetary Fund, African Development Bank etc, are by far the largest providers of funding globally for sustainable urban development, however still not sufficient to fill the gap. Through grants and loans, financing from MDBs helps leverage other sources of funding, ensure relevant expertise and trigger up-scaling of solutions for an enhanced impact.

Cities can access finance through borrowing, i.e. *debt finance*, and is commonly used for e.g. infrastructure projects. Such finance can be sourced from e.g. bonds, banks, pension funds or other public or private actors. With debt finance comes repayment of loans, interest etc, which might add financial pressure on the municipal budget while potentially posing both risks and additional costs.

Private finance of urban infrastructure has grown significantly over the last decades. *Public-Private Partnerships* (PPPs) is typically an arrangement for infrastructure project financing through a long-term contract between public and private entities, and can include the design, finance, construction and maintenance of public infrastructure. Depending on the agreement, risk distribution and responsibilities may vary. While PPP's in many instances are the »go to solution«, they require transparent and well-enforced regulations, accountable institutions at all levels of governance. Hence, such partnerships can also simply be viewed as the private sector operating in a regulated environment, e.g. in the provision of infrastructure and urban services, or in the provision of affordable housing. Some argue that the advantages of PPPs include the access to experienced legal, financial and technical expertise, addressing the lack in capacities among local authorities in particular, while enhancing efficiency in delivery. While this may be correct, there are also risks in skewed or unbalanced agreements, overrun of costs, and set-backs in quality of service delivery. Assessing the assumed financial and efficiency gains of a PPP over time is therefore critical. Developing financially viable interventions (bankable projects) requires a full understanding of the project cycle, from planning and investment to operations and maintenance. When an intervention comes with user fees or charges, understanding the perspectives of communities and users is critical.

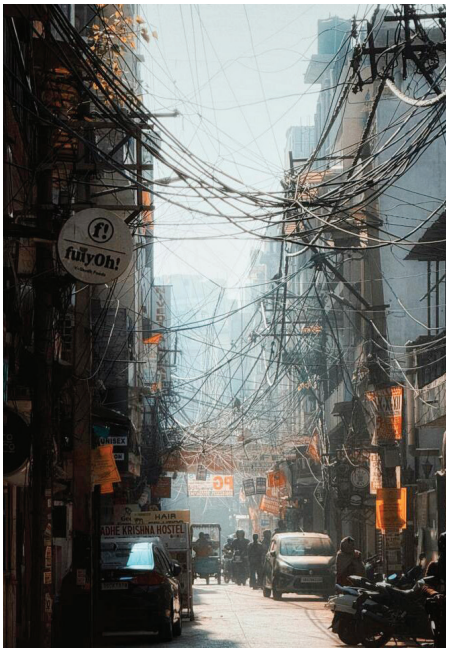


PHOTO: Keith Lobo, pexels.com

Lack of revenue often leads to a vicious circle of reduced quality in service delivery and maintenance, which in turn may affect willingness for citizens and businesses to pay fees for services.

Looking ahead

The interface between resilient spatial planning, municipal finance and investments is crucial for a strategic and long-term approach to sustainable urban development, where long-term investment needs (including priorities and phasing) are embedded in the budgeting cycles of e.g. ministries and municipalities.
Strategies for implementation of especially larger capital in-

vestment interventions, require the establishment of clear and transparent mechanisms for planning, design, procurement and execution, including reliable supply chains and performance monitoring. Ensuring value-for-money, minimized corruption and optimising use of resources is key.

Integrated spatial plans inform the overall need for capital investments, where projects are not managed in isolation, but rather as part of a longer-term strategy for urban improvements. Establishing clear regulatory frameworks as well as social contracts between local authorities and communities, as well as with financial institutions, is key.

In many countries, national governments retain control over planning, financing and implementation of key urban development projects, rather than distributing such responsibilities to subnational authorities. Underlying reasons include the lack of planning and management capacity at local level, management of national debt, political aspects and unwillingness to distribute power. However, sustainable urban development requires enhanced collaboration and coordination between different levels of government, including coherence in the policy and legislative environment, governance structures and the distribution of decision-making and financial capacities.

The *SymbioCity Approach* argues that integrated solutions in the planning and design of urban development interventions are key to attracting financing, ensuring financial and cost efficiency, and return of investment in the long-term perspective.

Integrated approaches to urban development improves living conditions and overall quality of life.

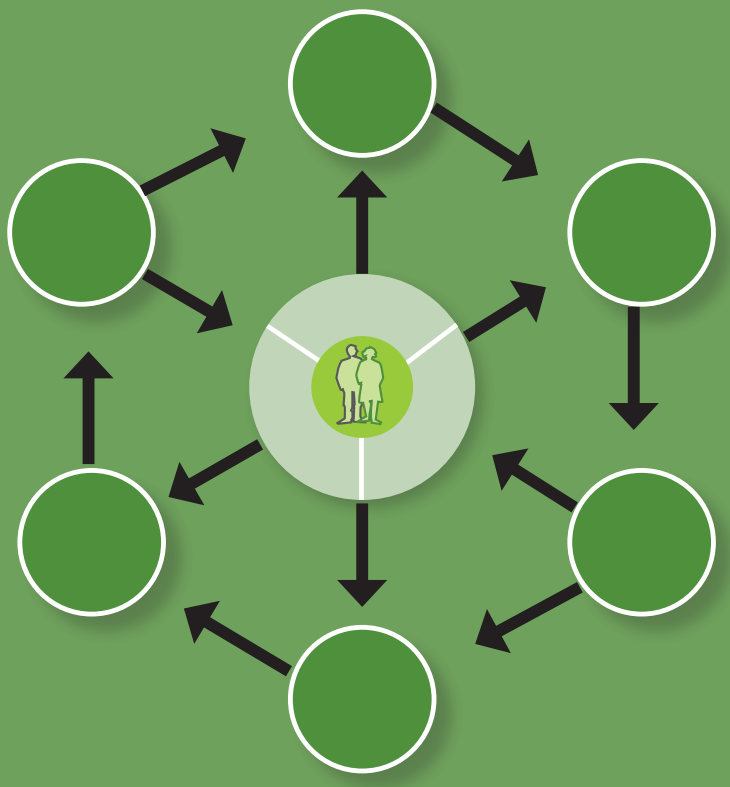
KEY TAKEAWAYS

- Access to finance relies on effective and coordinated institutions that are accountable, predictable, and that have clear mandates and responsibilities.
- Strengthened local fiscal systems and decentralised governance models empower local administrations to deliver services responding to local economies and needs.
- Integrated spatial planning informs municipal budgeting and the overall need for capital investments, contributing to longer-term strategies for urban improvements. Investment in relevant infrastructure can have a multiplier effect with benefits across different sectors.
- Land is in many instances the most valuable resource of a local authority, and land value capture is an important mechanism for local revenue generation.
- Public and private collaboration and partnerships can leverage access to financing and share risks, especially for larger capital investment projects.

PHOTO Klas Groth

5.

SUSTAINABLE URBAN SYSTEMS AND POTENTIAL SYNERGIES



URBAN SYSTEMS SYNERGIES

Urban functions and urban structure are considered as one urban system, while urban spatial planning is the institutional process that shapes the development of this system.

CITIES AND TOWNS are composed of various urban systems that provide essential functions and services that we use on daily basis, e.g. *water, waste and energy, greenery and ecosystems, transportation and mobility, public realm* etc. Within these systems, urban functions are provided such as housing, schools, work places and production, trade and commerce.

In promoting sustainable and resilient urbanisation, the provision and distribution of such *urban systems* and *functions* require a holistic, integrated and inclusive approach to development, ensuring equitable access to all, at affordable costs. Good urban governance, management and institutional capacities (incl. financing) are essential elements to meet the needs of the population, in particular the poor and disadvantaged groups.

To achieve optimal solutions and efficient use of resources, the *SymbioCity Approach* identifies *links and synergies* between various systems and functions, to arrive at integrated and inclusive solutions in response to economic, environmental and socio-cultural needs.

Urban areas are complex and dynamic where development objectives sometimes can be contradictory, e.g. conflicting strategies, competition over limited financial resources, vested interests or poor division of responsibilities. *Horizontal and vertical collaboration* and coordination can help address such barriers, e.g. between different tiers and units of government, between public and private sector, but also in the engagement of stakeholders, communities and beneficiaries.

The *SymbioCity Approach* promotes a *human-centric and value-driven* approach to development, supported by innovation and integrated solutions, where responses to urban challenges are informed by local conditions and needs, and where solutions are scalable and replicable for greater impact over time.

5.1 Urban functions and urban structure

Urban functions are integral to shaping everyday urban life and have significant environmental, economic and socio-cultural implications, and typically include *housing and residential development; economic and commercial activities; culture, sports and recreational amenities; education, health and other social services* etc. The provision and spatial distribution of such urban functions, as a system within the urban fabric (structure), is

informed by urban spatial planning, land use and development control.

Good spatial and urban planning and design contributes to equitable access to different urban functions, systems and services, including consideration to the needs of poor and marginalised communities. Accessibility to urban functions is promoted by mixed-use development on different urban scales, from city-wide to neighbourhood and block levels. Urban connectivity and proximity is essential to ensure access to services, income opportunities and to promote social inclusion. The spatial distribution of urban functions, land use and systems for transportation and mobility (including public transport, walking, cycling) are key elements for shaping the built environment, its structure and form, also to contribute to social, environmental and climate benefits.

KEY FACTS

THE GLOBAL OBSERVATORY OF SUSTAINABLE PROXIMITIES

The proximity concept, building upon the »15-minute city«, argues that urban form, planning and infrastructure can be used to encourage sustainable lifestyle changes, and urban areas that develop effective 15-minute city strategies are very likely to reduce urban energy use and emissions.

By placing people at the centre of the urban plan, the proximity concept aims to ensure an equitable distribution of all essential social functions – for living, working, supplying, caring, learning, and enjoying – so that all residents can benefit from shorter access time. It frees us from time spent travelling, and frees space from vehicular traffic.

Source: Global Observatory of Sustainable Proximities (C40 Cities, Charie ETI/Sorbonne, UCLG, UN-Habitat), https://www.c40knowledgehub.org/s/sustainable-proximities

Spatial and urban planning, especially in contexts of rapid urbanisation and growing urban populations, need to consider multiple urban scales simultaneously, from territorial to city wide, to neighbourhoods and local precincts, to ensure that the urban structure provides for equitable opportunities in the distribution and provision of urban functions.

From a *territorial development perspective* strategic spatial planning should consider cities and towns as nodes part of a larger context, including other urban centres, natural assets and rural areas. Spatial planning addresses the urban-rural continuum, for example in the provision of food and water and energy, but also infrastructure systems and appropriate locations for housing. Ideally, cohesive territorial development contributes to economic growth and in making efficient use of available resources.

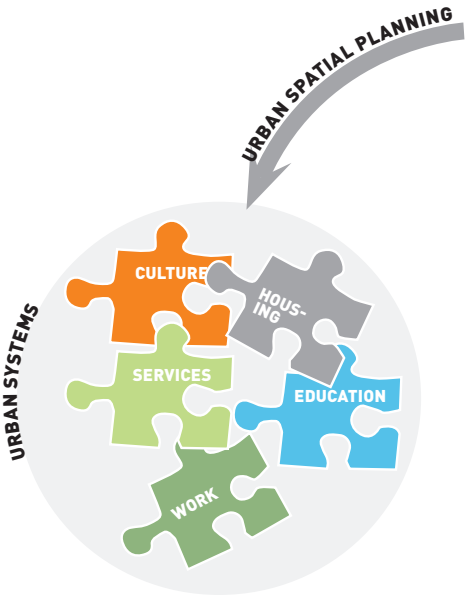


Figure 5.1
Schematic illustration of different urban functions and their interrelations.

Streetscape in Colombia.

Similarly, urban planning and design of a city, *neighbourhood or very local level* translates higher strategic goals into tangible transformative interventions and projects. UN-Habitat[44] promotes urban areas and neighbourhoods that are *compact, connected, vibrant, inclusive and resilient*, which collectively support equitable access and distribution of urban functions. The urban typology, appropriate density and design should promote a built environment of human scale, mixed land use, economic and socio-cultural inclusion.

In many contexts, the provision of *adequate housing* is essential and include e.g. s*ecurity of tenure, affordability, habitability, accessibility, location, availability of services and infrastructure,* as well as cultural adequacy. The provision of adequate housing is particularly important for poor and marginalized communities.

Commercial activities, markets and industries are urban functions that are integral to the local economy – sometimes even on regional or national level – providing not only services and business opportunities, but also jobs and income, stimulating local economic development. Economic activities and industries have diverse characteristics (heavy, light, knowledge-based, digital), and have different pre-requisites and needs for their operations. Some require large tracts of land for logistics and infrastructure and are labour-intense, while others have environmental implications e.g. in the use of energy, emissions, air pollution etc. The distribution of such urban functions should consider the urban context, the general living conditions, mobility and working patterns of the local context.

On the other hand, many industries and economic activities can contribute to a *green transition* and *circular economy*, e.g. by introducing clean and energy efficient technologies, reusing material, influence waste generation and consumption patterns etc.

Provision of and access to various *service functions (commercial, cultural, social)* is equally important, informed by expected population development, existing or assessed future deficits or surplus, as well as planned and expected urban development in general.

To meet the challenges of urban development, the *SymbioCity Approach* promotes strategies where available land and other resources are used efficiently. Generally, *a more compact, mixed-use and dense urban environment* increases access to urban functions, e.g. housing, social and commercial services. Urban *densification, regeneration and redevelopment* should be considered when appropriate, e.g. along transport corridors and at development nodes. Urban densification needs to be balanced and consider the capacities of infrastructure and services, while integrating a high-quality public space into the built and natural environment. Urban densification and renewal is particularly relevant when urban areas have reached a point where no additional land is available or suitable for expansion.

[44] My Neighbourhood, UN-Habitat, 2024.

The provision of urban functions should be informed by a thorough understanding of the needs and lived experience of the citizens, to inform pathways towards urban sustainability. Identifying and mapping such needs in collaboration with communities and stakeholders informs targeted and locally adapted responses.

KEY FACTS

URBAN FUNCTIONS – POTENTIAL SYNERGIES AND INTERFACES

- Mixed functions and land use and the degree of density support and maintains a diversity of social and commercial services.
- Identification of alternative development scenarios can stimulate synergies between integrated land use, mixed-use structures, green areas, public spaces, mobility systems and infrastructure.
- Urban development along corridors and nodes can create economies of scale and sustain public transport systems and other infrastructure and services.
- Improved public transport linked to services improves accessibility for residents to city centres, urban nodes, work places, and social and commercial services.
- The location of industries, wastewater treatment plants and waste collection facilities should be coordinated with other land uses, to mitigate possible impacts on the health and well-being of the inhabitants and the environment.

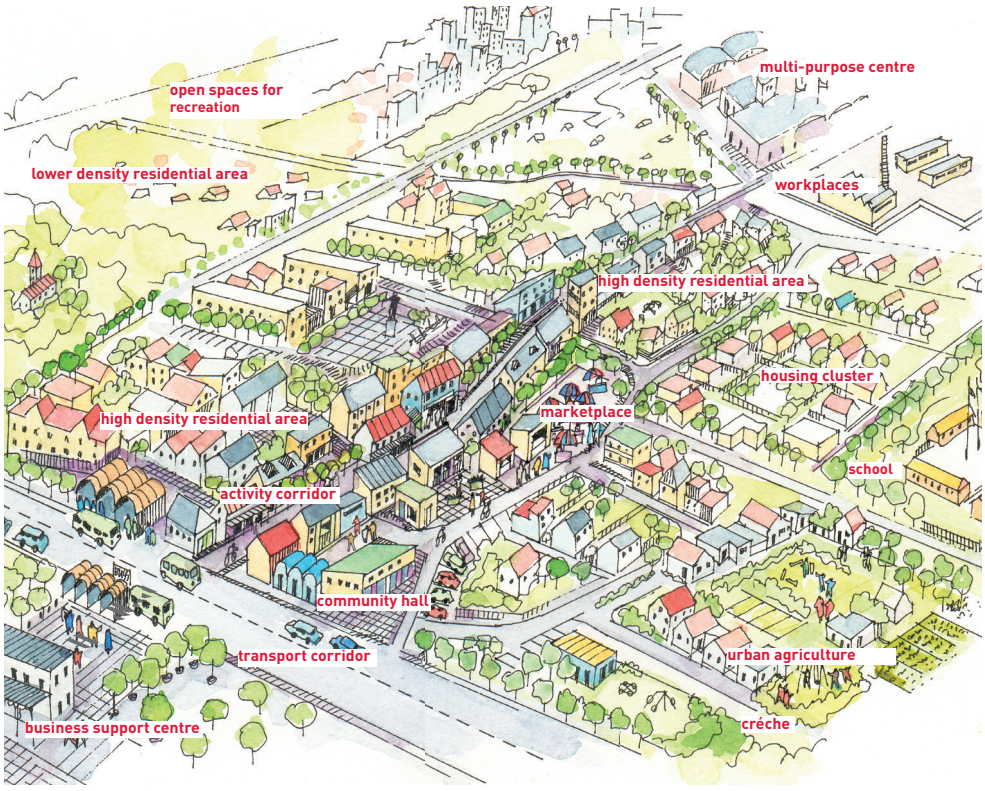


ILLUSTRATION Viera Larsson

Figure 5.2
The SymbioCity Approach promotes an urban structure with mixed land use and diversity of urban functions. Image from Sustainable Community Planning Guide, Nelson Mandela Bay Municipality, South Africa.

5.2 Public space and the public realm

Public space, or the *public realm,* can be regarded as the *cohesive element* that connects all urban functions. As the »the living room of the city«, this is where people meet and interact for various purposes, planned or spontaneously. Public space needs to be available, accessible and safe, making the urban space attractive for both citizens and visitors.

Public space manifests itself in different ways in the built environment, e.g. in the form of *parks, community gardens, squares, plazas, waterfronts, sports and recreation facilities, sidewalks and streets.* It also includes *public amenities and facilities* such as *schools, libraries, sports grounds, and bus stations.* Ideally, public space is readily available and free to use by anyone, and can be defined as public and semi-public, depending on its function, ownership and management. Other urban functions are private or semi-private, for example commercial facilities or residential units.

PHOTO Klas Groth

PHOTO Sixten Larsson

Public spaces have important social, cultural, recreational and economic functions.

Well-planned and managed public space promotes inclusion, health and well-being among urban dwellers, while also contributing to economic development, climate action and enhanced resilience. UN-Habitat argues that some 50% of available land should be dedicated to public space for urban areas to function properly, including e.g. streets, parks and squares. The lack of well-planned, designed and maintained public space reduces quality of life, health and well-being, while potentially increasing crime, congestion and social tensions.

Studies show that public space is used differently among women and girls versus men and boys. For example, women are often the primary caretakers in households, and use public space and urban facilities daily in a complex pattern of movements, taking children to school, grocery shopping, working etc. The provision of public space should be inclusive and consider different user groups and needs, especially in improving quality of life for people with disabilities, the urban poor and marginalized groups.

Adequate provision of public space ideally promotes environmental, socio-cultural, economic and spatial development. Integrating *nature-based solutions and ecosystem services* in the planning and design of public space, not only contributes to a *green urban environment* and sustained *ecological diversity,* but also enhanced *urban resilience* and the mitigation of impacts from climate change. For example, urban greening with an appropriate choice of vegetation combined with rainwater harvesting, can reduce heat islands and create pleasant microclimates in the city while absorbing water during heavy rainfalls to avoid flooding.

An active use of public space should be encouraged, where people feel comfortable and safe. The design is therefore important, as spaces that are too large and with limited furnishing can feel daunting making people feel exposed, isolated and insecure.

Too small spaces can lead to over-crowding and discomfort. Public spaces should be designed with a human scale, with trees, vegetation, benches and lighting to make them attractive, safe and user-friendly. Public space can be formal and informal, and are often used for spontaneous meetings, big and small. A well-planned and designed urban plinth is essential for the public space.

A continuous system and network of public space contribute to enhanced mobility and an attractive, interconnected and safe environment, preferably integrated with green areas to support preservation and development of urban ecosystems.

»By sharing space we will have more space!«

Dawn McCarthy, Director Land Planning & Management, Nelson Mandela Bay Municipality

KEY FACTS

PUBLIC SPACE – POTENTIAL SYNERGIES AND INTERFACES

- The provision, connectivity and design of public space in a city can support increased safety, security and social interaction, and in combination with social and commercial services, create a vibrant and attractive urban environment.
- Public space combined with greening and water management can have a positive impact on the urban climate and ecosystems and contribute to an attractive public realm.
- The distribution and design of public space should encourage mobility, especially for pedestrians and cyclists.
- Public space has an important recreational and social functions – especially in contexts where the private space is limited.
- Well designed and attractive public spaces contribute to the image and character of an area. They enhance the experience and quality of life of citizens and visitors.

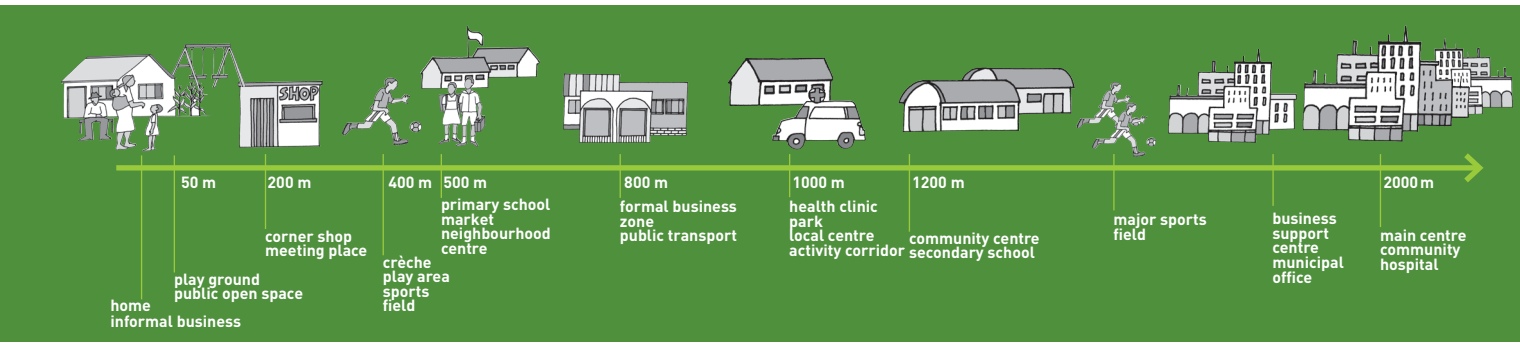


Figure 5.4
Integrated planning and design of urban area should promote access to services and mobility systems for all citizens. The image above indicates maximum desirable distances from any household to essential services and facilities.
Image from Sustainable Community Planning Guide, Nelson Mandela Bay Municipality, South Africa.

5.3 Urban landscape planning and ecosystems

Urban landscape planning integrates the planning and design of the built and natural environment, including the management of natural and ecological assets. Well-planned urban landscapes integrate *nature-based solutions and ecosystem services* to contribute to climate change mitigation and adaptation as well as the provision of ecosystem services. This is of particular importance in contexts exposed to heavy rainfall and flooding, or in drylands or areas with drastically rising temperatures. Further, well-planned urban landscapes reduce exposure from risks and hazards (for example landslides or flooding), and contributes to building resilient communities with social and environmental benefits, such as recreational and social activities. Similar to public space, urban landscapes contribute to ecological sustainability and should be planned in consideration of heritage and cultural aspects. Good urban landscape planning promotes:

- Strengthened biodiversity and ecological systems;
- Opportunities for climate change mitigation and adaptation, including enhanced urban resilience;
- The use of green and open spaces for recreational, social, cultural and economic activities;
- Opportunities for urban farming, agriculture and the recycling of organic waste.

PHOTO Mats Samuelsson

Rehabilitated lake in Växjö, Sweden.

Figure 5.5
Illustration of how different landscape elements can be connected to provide attractive, green public spaces, and support ecosystem services in an urban area.

The pressure on the green environment, its ecological systems, configuration and size, is increasingly under threat especially in contexts of rapid urbanisation and population growth. Urban landscape planning is instrumental in integrating the natural and built environments in optimal ways, to ensure that green open spaces are sustained in and around urban areas. Such green open spaces can include »green lungs«, green corridors and parks, water bodies, the planting of trees and other vegetation, also along streets and public spaces. Regions and territories often have unique topographical, geological and hydrological features which need to be considered in urban landscape planning to ensure sustainable ecosystems on both metropolitan and local levels.

The undisrupted continuity of green spaces in urban areas is of great value to flora and fauna, hence to ecosystems as such. They also offer social and recreational benefits for humans in accessing spaces for recreational and social purposes e.g. in the vicinity of their homes or places of work.

A hierarchy of *systematically connected green open spaces* linking green courtyards, urban parks and larger recreational areas, together with rivers, wetlands and ridges, can provide a natural »skeleton« within urban areas also linking to the larger hinterland. Typically, green open spaces in higher density areas tend to be more intensely used, calling for a diversified and balanced

provision of larger parks and green areas, smaller green spaces in neighbourhoods and pocket-parks on block level. Access and proximity to green areas and corridors with bicycle and walking paths, can function as meeting places as well as for sport and recreational purposes, of particular importance for residents in informal settlements and marginalized communities.

Establishing a green spatial network is an essential system and component of any urban area, and landscape planning needs to be an integral part in planning for both new developments and regeneration and redevelopment of the existing built environment. Development and settlements in e.g. valleys along riverbeds or on steep hill-sides should be avoided due to potential risks and hazards (flooding, land slides).

Housing and urban agriculture in Hammarby Sjöstad, Stockholm.
photo: Mats Egelius, BoStad

KEY FACTS

LANDSCAPE PLANNING – POTENTIAL SYNERGIES AND INTERFACES

- Integrated planning of landscapes, green spaces and blue-green networks, contributes to maintaining biodiversity and ecosystem services in urban areas, including purification and attenuation of water (e.g. open ponds, rivers, streams and channels).
- Green areas and networks are the lungs of the city which are essential as carbon sinks and to reduce air pollution and should be planned for recreational purposes, including walking and cycling.
- The topography and vegetation of urban landscapes and green areas can create moderated micro-climates, mitigate heat islands, reduce exposure to wind and influence energy demand.
- Wasteland areas or closed landfills can be redeveloped and transformed into green and recreational areas and parks.
- Green open spaces can be considered for urban agriculture.

5.4 Mobility, traffic and transportation

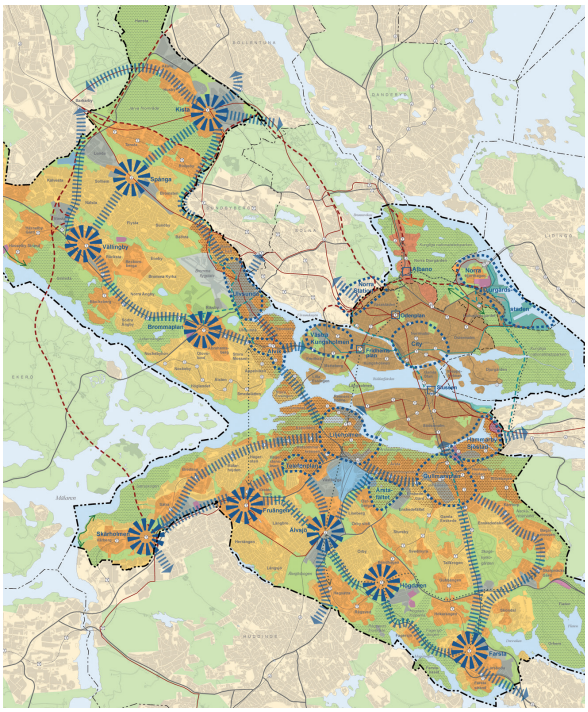
Well planned and connected urban areas offer accessibility and proximity to essential urban functions and services. In this regard, sustainable mobility and transport systems are key for enhanced productivity, social and economic equity, while contributing to an improved urban environment, health and well-being.

Ideally, an integrated transport and mobility system responds to diverse needs among e.g. residents, businesses and industries on regional, city-wide and neighbourhood levels, hence serving different purposes at different times. Simply put, regional mobility options covering larger urban territories are key for the urban-rural continuum, contributing to productivity, exchange of goods and services, commuting etc. Local mobility solutions serve similar purposes, but typically more frequently and linked to the

Figure 5.6
A possible transportation and mobility hierarchy in a city, town or area. Depending on the local context, different aspects of a sustainable mobility strategy can be prioritised.

needs of everyday life. Integrated transport systems with different mobility options allows for flexibility and choice, while contributing to resilience and robustness.

In metropolitan or larger urban contexts, urban and economic development typically takes place along corridors or clustered at nodes, which allows for economies of scale in the provision of sustainable transport and mobility solutions. *Sustainable Urban Mobility Plans* (SUMPs) and *Transit Oriented Development* (TOD) are examples of integrated approaches to planning and design of sustainable mobility solutions, combining land use and transport planning. The »last mile« should always be given particular attention to ensure links between public transport, pedestrian and bicycle routes.



MAP Stockholm City Council

Figure 5.7
The Walkable City (previous comprehensive plan of Stockholm)- an integrated approach to land use and mobility planning for enhanced connectivity and minimisation of exposure to noise, air pollution and risks.

Integrated mobility solutions, often referred to as Integrated Transport Systems (ITS), require the *planning, management and operations* of different mobility systems including *Non-Motorized Transport* (NMT e.g. bicycles, pedestrians), public transport (e.g. buses, subway, railways, waterways) as well as *private* and *commercial vehicles* (taxis, cars, trucks etc).

Understanding mobility trends and tendencies, as well as projecting future scenarios, is important especially in rapidly urbanizing contexts. Sustainable mobility solutions can be supported by technical advancements and innovation, institutional arrangements, enabling legislation and policies, strengthened capacity etc. *Information and Communication Technology* (ICT) is useful for different purposes, e.g. in the collection of data on the use of mobility and transportation systems (including modal splits). It also helps identify bottlenecks or other problems to improve service delivery and safety, and finally, supports integrated ticketing systems in public transport.

Transportation and traffic is ever increasing in urban areas, triggered by urbanisation and urban sprawl but also as a reflection of increased wealth where more individuals can afford a private vehicle. Private vehicles are the dominant mode of transport in most cities, contributing to CO_2 emissions as well as air and noise pollution. Improvement of vehicle technology together with the increasing share of electric vehicles (EVs) and renewable fuels, help mitigate the environmental impact. However, the absolute number of cars still pose problems in urban areas causing congestion on roads and consuming space that can be used alternatively. Car sharing (or pooling) can be promoted to reduce private vehicle ownership. Sustainable mobility and transport systems should be planned and designed with respect to the environment, to reduce energy demand and to reduce emission of greenhouse gases and pollution.

Urban planning solutions that promote public transport and Non-Motorized Transport (NMT) are essential to shift from the private car to other mobility options. Giving priority to public transport in the physical environment is one option to make it more attractive and efficient. Other means include financial incentives and taxes, e.g. congestion charges as in Stockholm, Sweden and London, England, and the introduction of »environmental zones« that gives priority to public transport in urban areas.

ILLUSTRATION SWECO/KTH Ulf Ranhagen

Figure 5.8
Mobility systems – scale and technological levels.

An integrated and sustainable approach to mobility promotes the use of public transport and NMT-solutions that are attractive, accessible and user-friendly. Ensuring traffic safety and security for all users is key, especially pedestrians and cyclists who are more exposed and vulnerable. Designated usage is preferred, however shared-space solutions can also be feasible, e.g. areas where driving is only permitted at low speed and with consideration to pedestrians. Heavy traffic and transport of goods (and particularly hazardous substances) should be coordinated with both land use and urban functions, to enhance safety and minimize environmental risks.

Spatial and urban planning has a key role in linking planning, land use and mobility solutions, offering economic opportunities e.g. along public transport corridors and at nodes, with improved access to social, cultural and commercial services. Mixed-land use and enhanced access to services contribute to a reduced need for private vehicles.

EXAMPLE

PRINCIPLES OF TRANSIT ORIENTED DEVELOPMENT (TOD)

The *Institute for Transportation & Development Policy* promotes approaches to urban development that is »designed to bring people, services, and activities together with quality public transport, supported by walking and cycling conditions to facilitate shorter trips, better lifestyles, and more efficient use of city resources«. Such Transit Oriented Development (TOD) principles include:

- **Walk** – develop neighbourhoods that promote walking
- **Cycle** – promote non-motorized transport networks
- **Connect** – create dense networks of streets and paths
- **Transit** – locate development near high-quality public transport
- **Mix** – plan for mixed uses, income and demographics
- **Density** – optimize densify and match transit capacity
- **Compact** – create regions with short transit commutes
- **Shift** – increase mobility by regulating parking and road use

Source: Institute for Transportation & Development Policy, https://tod.itdp.org/

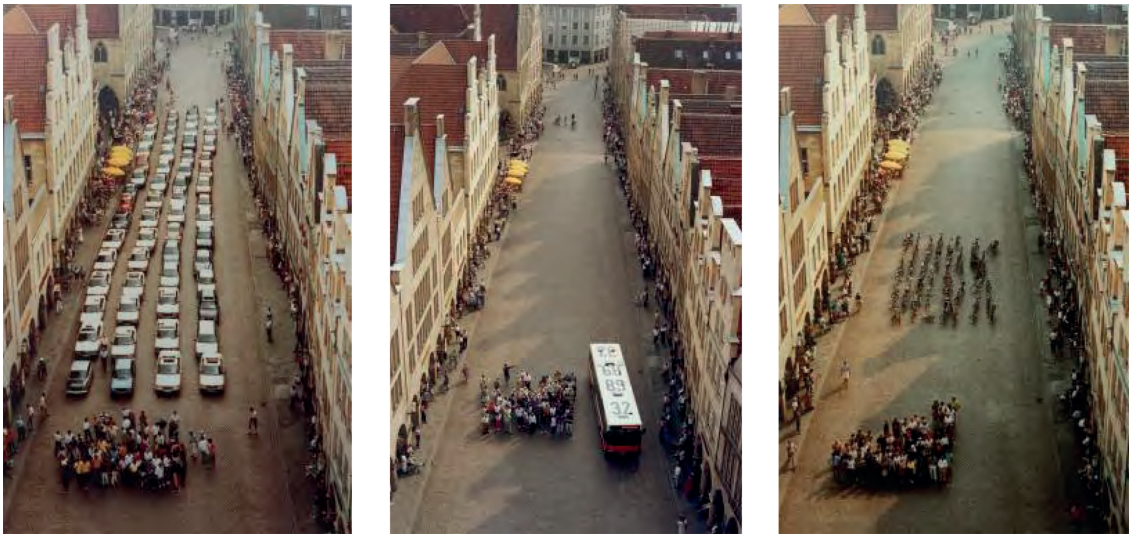


Figure 5.9
Comparison of the space required for 60 people to travel by car, bus or bicycle.
Image from City of Mûnster, Germany.
www.muenster.de/stadt/stadtplanung

EXAMPLE

NATIONAL VISIONS AND GOALS

The *Swedish Transport Administration* has identified three, overarching long-term goals for development of the national transport system until 2050:

- The transport system is inclusive and offers good accessibility for both citizens and businesses, regardless of location in the country;
- The transport system is fossil-free and its environmental impact is minimal;
- No one is killed (»Zero-Vision«) or seriously injured in the transport system, neither in accidents nor from air pollution and noise.

This implies e.g. reducing the need for traffic movements, enhanced utilization and restoration of existing systems, and introducing new systems and solutions.

Source: Swedish Transport Administration / Trafikverket

There are several interfaces between mobility systems and socio- cultural, health and environmental aspects. For example, the greening of a transportation system is essential to overcome the major environmental impact of cars. Citizens living close to traffic are at risk from toxic air emissions. Special bus lanes, light trains and cycle lanes contribute to sustainability and resilience. *'Green streets'* (where vehicles have no or limited access) or streets with pedestrian priority enhances the social and cultural ambience of the city. With good planning and design, a more attractive and lively built environment can be achieved.

EXAMPLE

INCENTIVES TO STIMULATE THE USE OF PUBLIC TRANSPORT

- Congestion charges on certain major roads, e.g. in Stockholm, Sweden and London, England
- Integrated public transport systems, e.g. Curitiba, Brazil and Bogota, Colombia
- Urban planning and design that reduce the need for travel and car use (mixed land use, access to services, 'neighbourhood' planning, etc.)

PHOTO Green Alternative

PHOTO Love to Ride Batumi

The provision of public transport networks and Non-Motorised Transport solutions are key for urban sustainability. Examples from Georgia.

KEY FACTS

TRANSPORTATION – POTENTIAL SYNERGIES AND INTERFACES

- Mixed land use and a variety of urban functions in neighbourhoods minimise the need to travel, increase accessibility, improve energy efficiency and decrease air and noise pollution
- Providing urban functions along development corridors and/or at urban nodes, combined with increased density, supports the use of public transport
- Digestion of biomass generates gas, which can be used as fuel for vehicles
- Well-planned mobility networks promote walking and cycling which also improves the health and well-being of residents
- Coordination of traffic and designation of heavy traffic and transportation of hazardous goods to certain routes can improve safety and reduce environmental risks.

5.5 Building design and architecture

In the *SymbioCity Approach*, sustainable architecture refers to the planning, design and construction of buildings that are adapted to local conditions, use environmentally friendly materials, are energy efficient, and provide a comfortable and healthy indoor environment.

Globally, buildings account for some 34% of energy demand and consumption and 37% of energy-related emissions (CO_2)[45], numbers that despite energy efficient technologies are expected to rise due to an anticipated global increase in floor area and wealth. The energy performance in buildings differs dramatically, depending on their design, function and location. Well-designed and energy efficient buildings can reduce their environmental footprint while being cost-effective, influenced by e.g. layout, structural design, choice of material and technical systems. Other factors include their orientation, the micro-climate and soil conditions.

The energy performance of buildings differs depending on solutions. Well-designed buildings capture passive energy, and in more advanced cases, use no energy (in principle) or even generate energy where the surplus is transferred back to the public grid. Ideally, well-designed buildings would require less cooling in hot climates, and less heating in cold climates. The exchange of energy (heating and cooling) between, or within, buildings is sometimes possible, for example in mixed land-use contexts. In essence, sustainable systems for energy, waste and water on micro-level (the building) can contribute to urban sustainability on macro-level. Assessing the environmental performance of buildings should consider both internal and external factors,

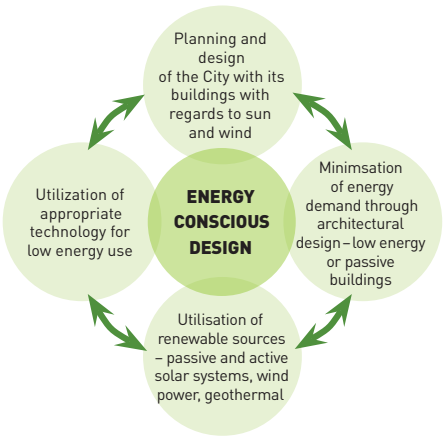


Figure 5.11
Different interlinked aspects to consider in the planning, layout and design of sustainable buildings.

[45] International Energy Agency / UNEP, 2022

including the potential effects on humans and the natural environment.

Sustainable architecture is the construction of simple but well-designed, functional and healthy buildings from locally sourced and environmentally friendly materials, that offer climate and weather protection (heat, cold), and that are affordable. Integrating traditional experience and know-how can contribute to this, where cultural traditions and vernacular architecture can play an important role in building design. Transferring qualities that have developed over time based on the specific conditions in a particular local context, to contemporary designs can contribute to a physical, built environment that people own and feel proud of.

PHOTO Emile Hendricks

Solar power panels in the Eco Village in Galeshewe, Kimberley, South Africa.

EXAMPLE

BUILDING DESIGN –
POTENTIAL SYNERGIES AND INTERFACES

- Energy demand in buildings can be reduced through choice of materials and technical solutions (insulation, design of windows etc) but also by orientation and design in relation to the surrounding landscape and microclimate (e.g. sun and wind protection).
- Green roofs can attenuate storm water and contribute to cooling during hot seasons.
- Buildings and their surroundings should be designed to contribute to improved environmental performance and management, including separation and collection of waste.
- Orientation and design of building should ensure easy access to bicycle and walking networks.
- Multi-purpose buildings accommodating both e.g. housing and small-scale businesses often have social and economic advantages.

Example of housing built in wood, Sundbyberg, Sweden.
Source: www.arvet.se

Sara Kulturhus, cultural center and hotel, constructed in wood in Skellefteå, Sweden.
Source:
www.white.se/www.svenskttra.se

EXAMPLE

TRANSITION TO RENEWABLE ENERGY

Kenya has over the last decades increased its supply of energy from renewable energy sources. Of the total energy supply in 2023, biofuels and waste represented 61,6%, wind and solar 18% and hydropower 0,8%, predominantly domestically generated. The remaining energy demand is imported including oil (16,7%) and coal (3,0%).

Source: https://www.iea.org/countries/kenya/

5.6 Energy systems

The energy sector includes the production, distribution and use of energy for different purposes. In urban areas, a sustainable supply and use of energy should be a priority, including renewable energy sources and enhanced energy efficiency across sectors and levels. Buildings account for 34% of the global energy demand and 37% of energy related emissions (CO_2). Enhanced energy efficiency and performance is linked to proper urban planning, building design and production and construction processes. Further, the energy demand and efficiency in urban areas also depend on systems for e.g. transport, vehicle technologies, infrastructure and lifestyles.

Renewable energy solutions and technological advancements, including solar and wind power, are today more widely accessible and used. Reliable and efficient energy distribution systems are key, and district solutions for heating and cooling can be an option in densely populated areas. Alternative, environmentally sound technologies on household level are increasingly available, however its usage is informed by both awareness and affordability.

According to the WHO[46], population growth in urban areas outpaces access to reliable and sustainable energy sources, with some 685 million people globally without access to electricity or other modern energy services, and some 2,1 billion people not having access to clean cooking fuels. The widely use of e.g. charcoal, wood and paraffin as energy sources has environmental, health and risk implications, contributing to some 3,2 million premature deaths every year. This especially affects women and children among poor and vulnerable communities, for example in informal settlements. A shift to clean energy sources, cooking technologies and properly insulated houses contributes to an improved living environment, health and well-being.

The built environment, including the transportation and construction sectors, are the largest consumers of energy, while also accounting for the bulk of CO_2 and greenhouse gas emissions. Enhancing the efficiency of public transport systems can contribute to reducing energy use while having positive environmental impacts in terms of CO_2 emissions, air and noise pollution.

An efficient and resilient energy system, with equitable access and distribution, requires interventions on different levels and with diversified technologies, using renewable energy sources to also mitigate climate change and environmental degradation. National and local governments play a key role in enabling such a shift, and various measures include the introduction of relevant policies and strategies, financial instruments and incentives, innovation and technologies, as well as engaging stakeholders in identifying possible solutions, from energy providers and distributors to end-users among residential, commercial and industrial sectors.

PHOTO courtesy SCP Guide, Port Elizabeth, South Africa

Clean, renewable energy sources can contribute to addressing the lack access to electricity and other modern energy services.

[46] World Health Organisation, 2022.

KEY FACTS

SUSTAINABLE ENERGY – POTENTIAL SYNERGIES AND INTERFACES

- The use of energy in urban areas can be reduced by energy-saving urban planning and building design, production processes and technologies.
- Digestion of biodegradable waste can produce gas for cooking, heating, transportation etc.
- Reduced burning of biomass reduces deforestation, protects ecosystems that absorb CO_2, and improves the indoor environment, health and well-being.
- Incineration of waste in large-scale CHP-systems (Combined Heat and Power) systems can be considered – but high emissions standards and the optimum technology are essential to limit dioxin emissions.
- Alternative, affordable, efficient and environmentally friendly energy solutions can be developed through cooperation between the energy sector and local authorities, contributing to job creation, a better environment and a diversified and safe supply of energy.

5.7 Waste management

Sustainable waste management is essential to improve the environment, health and quality of life for urban dwellers. Conscious production and consumption contribute to minimizing generation of waste, and ideally, promote circularity and an efficient use of resources.

Efficient and resource-conscious waste management is influenced by organisational, operational, technical and financial aspects and capacities. Key objectives include reducing harm on humans and the environment (water, air, soil, flora, fauna) as well as mitigating nuisances such as noise or odours.

The commonly used »waste hierarchy«[47] illustrates principles for sustainable management of waste according to five steps (in order of priority):

1. *Reduce* (Minimise) the waste volumes and hazardous waste in production, packaging, distribution and consumption;
2. *Reuse* waste for example by marketing and selling second-hand products;
3. *Recycling* of waste for example by using the material from packaging and other products as a source for the production of new products;
4. *Recovery* of energy from waste in order to replace other non-waste material;
5. *Deposit and treatment* of waste residues in landfills – the last alternative when all other options have been used.

Figure 5.12
Example of hierarchy for sustainable management of waste.

[47] Inspired by the waste directive adopted by the European union.

Many urban areas suffer from insufficient waste management systems, including waste separation, collection and control, including landfill standards. While reducing the amount of waste is paramount, reuse and recycling coupled with new technologies can improve efficiency in waste management and contribute to the circularity of resources. Waste that isn't possible to reuse or recycle, should be managed in an environmentally safe manner without compromising the health of humans or nature. Reducing the need to deposit waste on landfills is a key target.

Old landfills, after thorough assessments and measures taken to ensure e.g. no leakage of harmful substances, can be transformed into green areas to improve biological diversity, and possibly even as parks or recreational areas if the area is secured from risks and harmful substances. New landfills should be established with the highest environmental and safety standards possible, to improve the environment and reduce health risks. With appropriate technologies, landfills can also include gas generation and recovery systems.

Local authorities are typically responsible for waste management on local level, sometimes in collaboration with private sector. Establishing waste management plans is essential, also to promote reduction in waste generation and to promote circularity in the use of resources. For example, organic waste can either be used for composting, energy generation or as fertilizer in agriculture. Increased awareness among businesses, industries and households of what constitutes waste and how it should be managed is key to improve efficiency in waste management.

Separating types of waste in different fractions and according to source can help achieve waste management targets more efficiently. For example, household and industrial waste should not be mixed and hazardous or contagious waste must be inciner-

Combined waste management and energy production facility in Copenhagen, also functioning as an environmental education center and ski slope.
Source: www.big.dk

Figure 5.13
Waste systems – scale and technological level.

ILLUSTRATION SWECO/KTH Ulf Ranhagen

ated, alternatively, contained in specially designed and protected landfills. Identifying, separately collecting and treating hazardous waste from industry, hospitals, etc is paramount to minimize environmental impact and to reduce health risks.

Dumping waste in open areas is unacceptable, and waste collection and management should be undertaken in a controlled and environmentally safe manner also to avoid harm and health implications for humans. Sustainable waste management requires public awareness and cooperation among stakeholders, including communities and the private sector, creating economic opportunities in both the formal and informal sector, for example in slums and informal settlements.

EXAMPLE

WASTE MANAGEMENT IN SWEDEN

In 2022, waste management in Sweden treated approximately 20 million tonnes of waste, excluding waste from the mineral sector, corresponding to some 1,9 tonnes per capita (1,8 tonnes non-hazardous and 125 kilogram hazardous)

Incineration with energy recovery	44,7%
Material recycling	26,1%
Biological treatment	16,5%
Landfilling	6,1%
Other recovery	5,2%
Backfilling (land recovery)	0,9%
Incineration without energy recovery	0,3%
Other disposal	0,1%

Source: Swedish Environmental Protection Agency (Naturvårdsverket), 2024

KEY FACTS

SUSTAINABLE ENERGY – POTENTIAL SYNERGIES AND INTERFACES

- Reducing and re-using waste can contribute to less energy demand and environmental degradation.
- Minimisation of industrial waste and replacing hazardous substances requires collaboration between environmental and waste authorities and industry. Separation of industrial and hazardous waste from household waste reduces the risk of health implications.
- Waste to energy solutions can include digestion of biodegradable waste (e.g. wastewater sludge to gas) or waste incineration (requires rigorous environmental control)
- New landfills need to be carefully planned and located to protect water sources, soil and the natural environment from pollution, while ensuring a healthy living environment.
- After careful assessments, previous waste dumps can be rehabilitated for ecological and recreational purposes.

5.8 Water management and sanitation

Water supply and sanitation, directly impacting the health and well-being of billions of people, is a fundamental dimension of sustainability. The *Sustainable Development Goal 6* aims to ensure water security for all, while protecting the planet's water resources.

KEY FACTS

PROGRESS IN REACHING SDG GOAL #6 ON WATER AND SANITATION (2024):

Between 2015 and 2024 progress has been made globally in ensuring access to water and sanitation, however still:

- 2,1 billion were without safely managed drinking water (74%),
- 3,4 billion were without safely managed sanitation (58%),
- 1.7 billion were without basic hygiene services (80%).

Source: UN DESA, https://sdgs.un.org/goals/goal6#overview

Fresh water is a scarce resource in many parts of the world and needs to be carefully used and managed. Access to safely managed potable water needs to be secured in urban areas. Water sources, both upstream and downstream, such as ground water, lakes or rivers need to be sensitively used and protected from pollution and contamination. Measures in urban areas include closed systems, minimising release of wastewater and harmful substances into water basins or reservoirs and controlled land use in catchment areas. Efficiency in the management and use of potable water can be improved by maintaining infrastructure and minimizing leakage, while enhancing awareness of the importance of water conservation and saving among end-consumers, such as households, businesses and industries.

Improved wastewater management, through water and sanitation utilities, should reduce wastewater volumes and enhance efficiency in treatment methods. Depending on context, infrastructure systems and population density, water-based sewerage systems and treatment plants should be considered.

An integrated approach to planning and design of urban areas promotes an efficient use of various sources of water, combining natural and human systems to create synergies that support sustainable water management. Identifying opportunities for water retention and harvesting from different sources can contribute to decreasing the use of potable water, e.g. collection of rainwater in ponds or tanks for watering gardens and green areas. If free from harmful substances, filtered grey water can be used for similar purposes. If separation of wastewater is an option from a technical and economic perspective, 'black' water can be used as an energy source, as it contains organic material.

Integrating *Nature-Based Solutions* in the planning and design of green areas, parks, streets and squares can contribute to retaining, harvesting and managing water efficiently, while providing other benefits such as cooling of the built environment in hot climates.

Minimized and efficient use of potable water is key, particularly in water-scarce regions. Large systems solutions tend to be long-term and mostly irreversible and weak management of water resources also leads to water shortages. Sustainable options need to be carefully explored from a comprehensive systems perspective considering e.g. water conservation, groundwater pollution, health and hygiene, socio-cultural aspects and affordability. Designing a just and transparent tariff system is essential, and should include consultation with all stakeholders.

KEY FACTS

WATER SUPPLY – POTENTIAL SYNERGIES AND INTERFACES

- Dumpsites, landfills and industries must be located and managed to avoid pollution or contamination of water resources.
- Water and wastewa§1ter treatment plants can contribute to energy efficient solutions, e.g. by digesting biodegradable waste, wastewater sludge etc.
- Water and wastewater quality can be improved through collaboration between public entities (utilities), industry and other stakeholders, to reduce environmental problems 'upstream'
- Collaboration and coordination between planning and utility departments can prevent environmental degradation while promoting synergies in technical solutions.
- Increased public awareness can contribute to more efficient water management and reduce risk of environmental health implications, e.g. waterborne diseases.

ILLUSTRATION SWECO/KTH Ulf Ranhagen

Figure 5.14
Water supply and sanitation systems – scale and technological level.

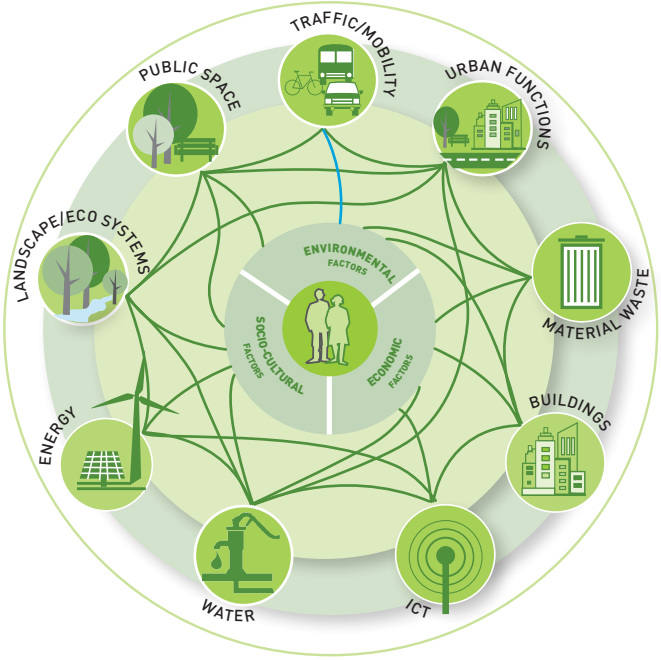


Figure 5.15
The SymbioCity approach promotes urban development processes that consider potential synergies and add environmental, socio-cultural, economic and spatial benefits.

5.9 Urban systems – synergies and climate change

The *SymbioCity Approach* promotes integrated urban development processes and initiatives where synergies between urban systems and functions can be harnessed and contribute to environmental, economic, socio-cultural and spatial benefits. Such synergies can be referred to as »systems solutions«.

Identifying and realising synergies depends to a high degree on the enabling environment, including the institutional framework and setting, legislation and regulatory frameworks etc, as well as for mitigating potential barriers or conflicting interests. Examples of potential synergies and how they relate to e.g. climate change are presented below.

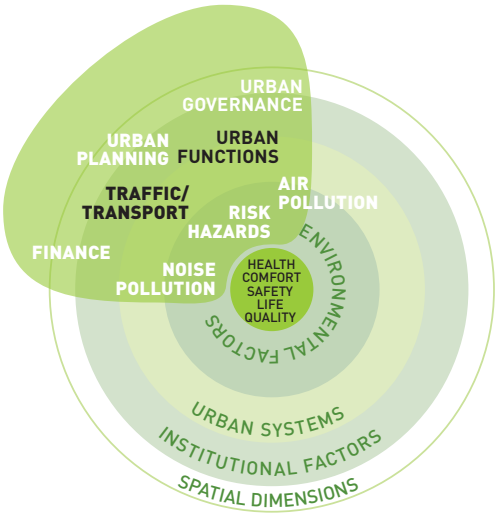


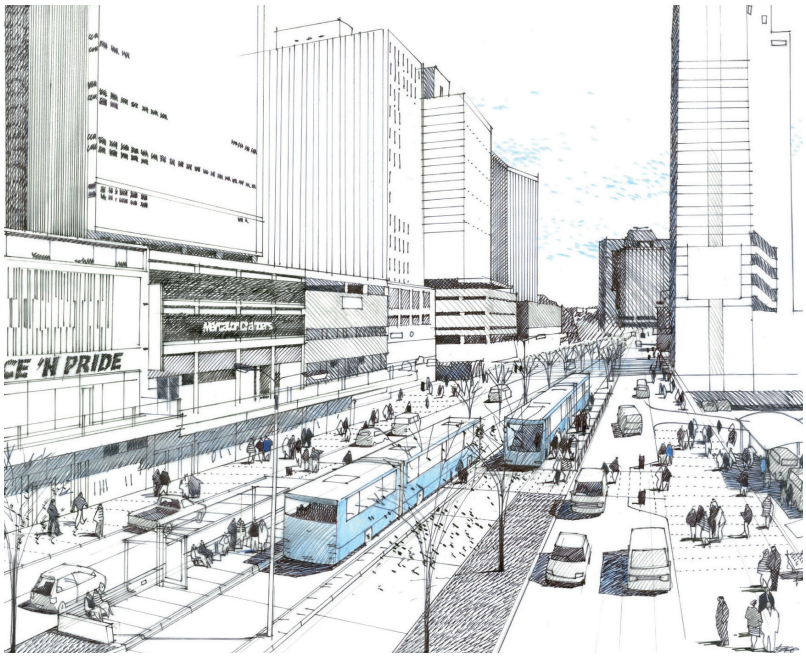
Figure 5.16
Some of the aspects to consider in planning for mobility systems.

Synergies – planning of public transport and transportation systems with regard to the location of urban functions

Integrated approaches to planning of mixed land use areas in combination with planning of the mobility and transport system, can reduce the overall transportation need, while also influencing the use of energy and thus the reduction of greenhouse gases. This approach is also the prerequisite for the development of efficient mobility and public transportation systems in a city or town. The urban density (compactness) and distribution of urban functions are of significant importance to overall transportation patterns in urban areas. By comparing areas with the same level of car ownership per capita, but with different urban densities, transportation intensity decreases in direct proportion to urban density[48].

Developing an urban pattern with higher density, especially

[48] Newman, P & Kenworthy, J (1989) Cities and Automobile Dependence: a Source Book.



The Bus Rapid Transit system in Nelson Mandela Bay Municipality (South Africa) was planned to improve mobility and connectivity, while reducing urban sprawl.

at nodes and along transportation corridors, is an efficient way of promoting public transport solutions which together with Non-Motorized Transport systems, can contribute to counteracting urban sprawl and the development of commercial, offices and housing in peripheral locations where land is cheaper.

Assessing alternative scenarios for land use planning and transportation systems in the urban structure, can facilitate identification of spatial planning solutions that have the best combined benefit, environmentally, socially and economically.

Synergies between energy, waste and water resource management and landscape planning

Integrated approaches and solutions in the provision of water, sanitation, energy and waste systems can contribute to environmental, economic and social benefits. Depending on context, there are a number of potential synergies where organic waste and residue from various sources can 1) be used to produce methane in biogas reactors; 2) be used as fertiliser in agriculture or for urban greening; 3) be composted, though this may require rather than generate energy depending on technology, and; 4) be composted where treated wastewater sludge can be used to fertilise biofuel crops for use in large, medium or small power plants. Such synergies, also contributing to circular economies, depend on the quality of the organic waste, including prevalence of possible toxic substances.

Green areas are needed to manage residual products. Integrated planning of landscapes and ecosystems that includes water resources, wastewater treatment and waste management, can

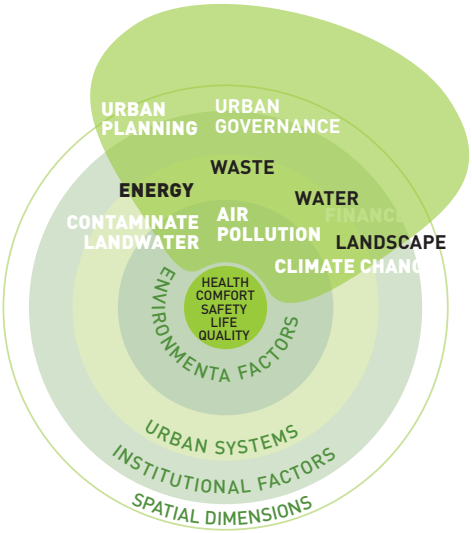


Figure 5.17
Some of the aspects to consider when planning for basic services.

contribute to ecological solutions. Properly treated wastewater can be used in green and recreation areas, and former landfills can be converted into urban green landscapes.

In order to identify optimal solutions, the involvement, buy-in and cooperation with communities, civil society and the private sector is essential. Awareness raising, communication and training is important in pursuing sustainable environmental solutions and quality standards.

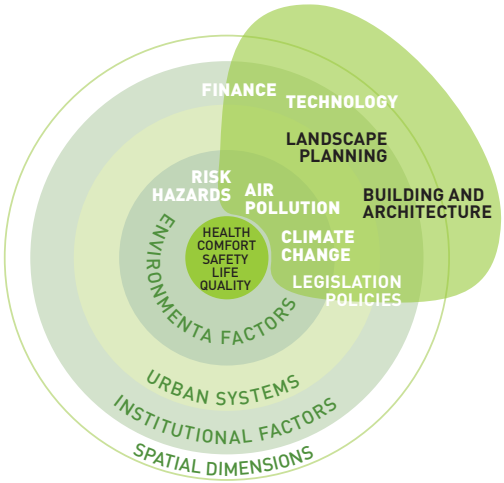


Figure 5.18
Some of the aspects to consider in sustainable building design.

The SymbioCity Approach promotes urban review and planning processes that consider potential synergies that can add value to the environmental, economic, socio-cultural and spatial dimensions of development.

Synergies between building design and the microclimate and surrounding landscapes

Conscious planning, layout and design of buildings should be adapted to the local conditions and the microclimate, for example by making use of solar energy for heating or generation of electricity, or the protection of buildings from wind exposure to reduce energy demand for heating. Such adaptation needs to be promoted by urban planning policies, public awareness and cooperation between public authorities and private/public developers.

Synergies and climate change

Climate change mitigation and adaptation are key urban planning and design objectives. Mitigation involves proactive measures to reduce and absorb CO_2 emissions i.e. to reduce sources and increase carbon sinks (ecosystems). Mitigation is the key strategy when planning urban form and structure, the built environment, infrastructure, transportation, energy systems, etc.

Adaptation refers to the adjustment of natural and human systems to changing environmental conditions. Both impacts and vulnerability can be reduced by adaptive measures. Planning of urban systems should consider integrated strategies and solutions to enhance efficiency and reduce costs, including institutional arrangements that promote inter-sectoral collaboration and coordination.

Urban sprawl is a concern in many growing cities and urban areas as it contributes to inefficient use of resources, e.g. increasing reliance on motorised transport. Limiting urban sprawl is often challenging due to lack of governmental capacities, lack of alternative land etc. If well-planned, systems for Bus Rapid Transit is one example that can contribute to reduction of urban sprawl. Adaptation to climate change should include the strengthening of capacities and resilience margins of existing and planned systems, in order to accommodate predicted future impacts without major redesign and redevelopment. Urban structures and infrastructure can be adapted in a variety of ways, not all of which require complicated technological solutions. Planned adaptation can include planned retreat, accommodation or protection measures.

EXAMPLES OF HOW URBAN SYSTEMS CAN MITIGATE OR ADAPT TO CLIMATE CHANGE IMPACTS

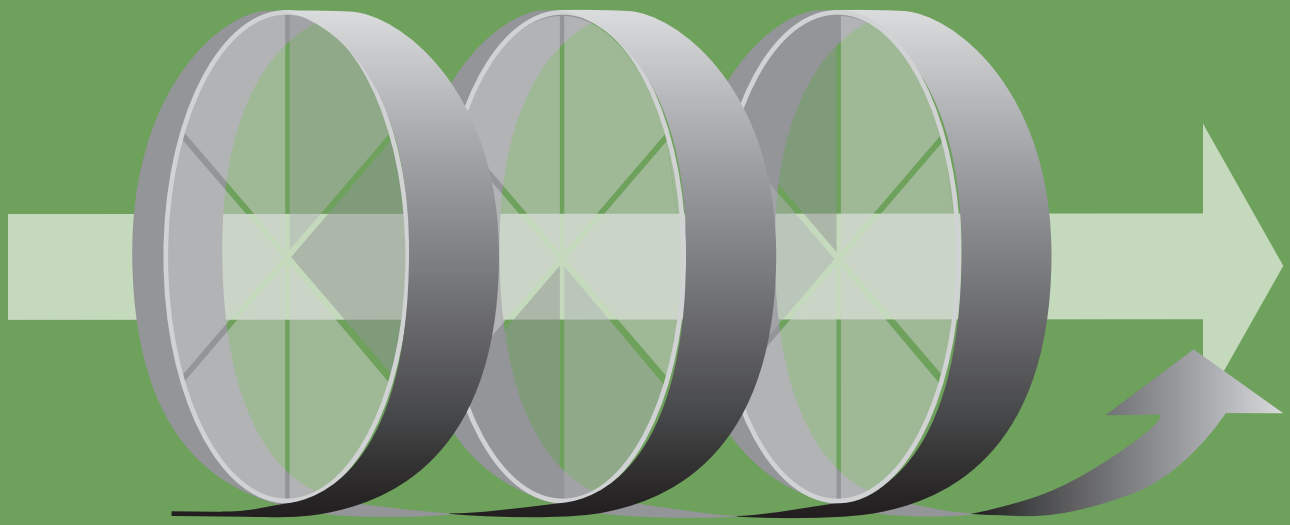
Urban Systems	Climate Mitigation	Climate Adaptation
Urban structure and urban functions	Avoid urban sprawl and promote a compact city to reduce transportation. Promote efficient heating and cooling systems.	Avoid urban sprawl especially in low-elevation coastal zones and promote compact development on higher levels. Avoid high-density settlements on high-risk sites.
Landscape planning	Green areas contributing to renewable energy and as carbon sinks.	Prevention of heat-island effects and attenuation of storm water.
Building design	Building design and insulation to reduce energy demand.	Building design and insulation to withstand extreme temperatures and climate variations.
Mobility traffic and transportation	Promotion of sustainable transportation – walking, cycling and public transport (also on water); green logistics; replacement of fossil fuels with renewable energy.	Realignment and relocation of threatened roads, railways, airports and ports.
Energy	Increased energy efficiency/ reduction of energy demand and fossil fuel dependency.	Strengthen transmission and distribution efficiency; reduce dependency on single sources; promote decentralised systems.
Waste management	Reduce, reuse, recycle, recover; use waste as a resource and minimise GHG emissions.	Protect landfills from flooding and earthquakes to avoid pollution; Remove garbage from drainage channels to prevent pollution and increased flooding.
Water management	Minimise energy needed for water management, and thereby GHG emissions.	Expanded rainwater harvesting, water storage and conservation techniques, water reuse, desalination, water-use and irrigation efficiency.


Nyundo
River
Green Zone
Market

6.

WORKING PROCEDURES

APPLYING INCLUSIVE AND TRANSPARENT PROCESSES



VISION
VALUES
GOALS

THE SymbioCity Approach CAN BE APPLIED WHEN:

- initiating and undertaking development planning processes on different urban scales;
- preparing development or regeneration strategies and plans for existing cities or new towns, districts and neighbourhoods;
- reviewing existing plans or conducting Urban Sustainability Reviews (USR) of a specific thematic area (or sector) or for a city, town or district;
- initiating responses for urban recovery and reconstruction in crisis and conflict contexts;
- analysing institutional or organisational frameworks in urban contexts.

The SymbioCity Approach fosters sustainable urban development through an integrated and holistic methodology, encouraging stakeholder participation, knowledge sharing and ownership of transformative solutions. Through an iterative process and cyclical way of working, it incorporates various issues of relevance for urban sustainability.

Application of the *SymbioCity Approach* builds upon six overarching steps that guides the process from idea to implementation. Although cities and towns frequently encounter similar challenges, the contexts in which they operate are unique. The process therefore needs to be adapted to the specific needs and conditions of the city.

The *SymbioCity Approach* can be applied in various urban development and planning scenarios, including the preparation of strategies and plans, conducting sustainability reviews, enhancing existing policies with sustainability elements, or when developing transformative urban interventions. The methodology is applicable across different urban scales including regional, city-wide, neighbourhood, or local levels. Through its inclusive nature, the methodology facilitates dialogue and cooperation among urban stakeholders and communities to raise awareness on urban sustainability.

Application of the *SymbioCity Approach* will benefit from a *politically endorsed vision*, serving as a starting point and reference throughout the process. If such a vision is lacking, it can be created during the process. Regardless, it is imperative that elected representatives, senior officials and other key functions of a local authority understand, embrace and can communicate the vision. Similarly, creating a joint understanding and definition of urban sustainability among stakeholders, and what it implies in a particular context, is essential as both entry point and reference. Such a definition can evolve over time.

An active engagement by elected representatives and officials of relevant authorities as well as among identified urban stakeholders and communities, is key in creating the necessary buy-in, owner- and stewardship of the process and its outcomes. It is particularly important to ensure that the voices of marginalized groups are represented, for example through gender perspectives and pro-poor approaches. While urban development initiatives often are driven under the mandate of local authorities, bottom-up and community-driven processes are equally important.

How to apply the SymbioCity Approach?

Planning for sustainable urban development is not a linear nor a static process. The working process is therefore organized around six iterative steps clustered in three loops, starting off with responding to questions such as »where are we«, »what do we want to do«, and »why?«. The second loop, »the planning«, defines the goals and explores possible alternatives and solutions to reach them, while the third and final loop responds to »how do we get there«, ensuring that proposed solutions are implementable and have a transformational impact. The six main steps of the working process are:

1. Define and organise the planned work, task or intervention;
2. Analyse and make a diagnosis of the current situation;
3. Set a vision, goals and objectives;
4. Develop integrated solutions, including alternatives;
5. Assess benefits and impacts;
6. Establish implementation strategies and actions plans, incl. monitoring and follow-up.

The **First Loop** focuses mainly on *Steps 1 and 2* where the work is defined and organized with a set purpose and goal, agreed timelines and distribution of tasks. Based on available information and data related to the intervention, an analysis and diagnosis of the current situation should be initiated. Finally, an initial and common understanding of urban sustainability and the city's overarching vision, if relevant, should be discussed and agreed upon among participants.

The **Second Loop** focuses mainly on *Steps 3 and 4*, where the diagnosis is further developed while the objectives and targets related to the intervention are defined. This provides the foundation to explore possible solutions, including scenarios if relevant.

The **Third Loop** focuses mainly on *Steps 5 and 6* where the tentative solutions are assessed and evaluated, considering both their impacts and benefits. Strategies and action plans for implementation are formulated and agreed upon. Previous steps 1–4 should be completed by now, but can be revisited if needed.

The proposed cyclical and iterative process allow for previous conclusions or assessments to be *re-visited* and *re-evaluated* if needed, offering opportunities to *re-consider* as new information or influences may have arisen. Hereby, the quality of both the process and its outcomes will increase, laying the foundation towards urban sustainability. Typically, urban development processes are complex hence it is useful to establish the broader objectives and pathways in the beginning, while elaborating complexities towards the end. This helps avoid getting stuck in details during the initial stages.

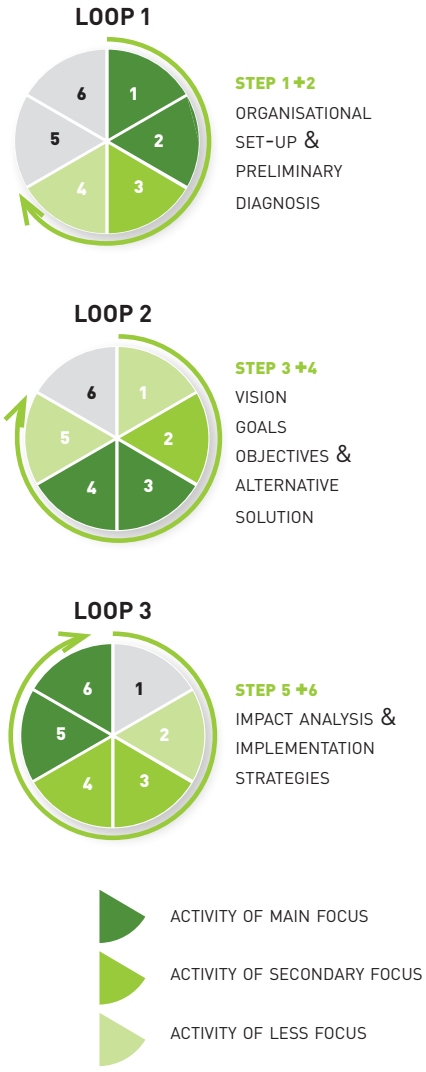


Figure 6.1
The working process is organized around six iterative steps clustered in three loops.

Methods and tools – The SymbioCity Approach Toolbox

The working procedure of the *SymbioCity Approach* is supported by a set of methods and tools that can be applied at different stages of the process.

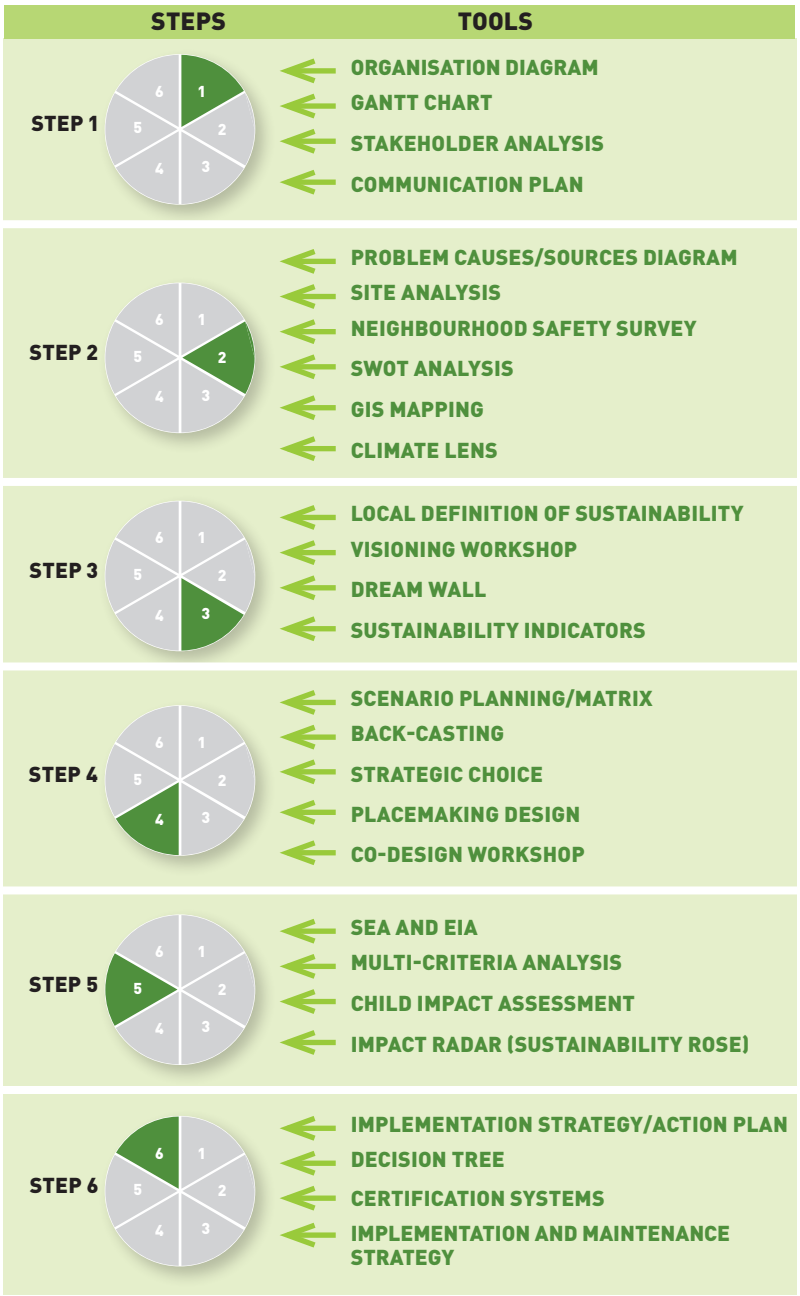


Figure 6.2
Overview of various tools that can be applied in a flexible way at different stages of the SymbioCity process.

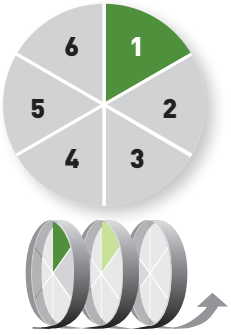
Most tools can usually be applied involving different stakeholders in planning and design processes, including e.g. SWOT, mind mapping, structured brainstorming and radar graphs. Other tools are more intricate and may require previous experience and analytical skills, such as defining objectives, targets and indicators or multi-criteria analysis. Digital tools such as *Space Syntax, Com-*

puter Aided Drawing (CAD), Geographic Information Systems (GIS) are very useful for more advanced spatial analysis, however requiring specific skills and expertise as well as data sets in certain formats. These tools are therefore not described in detail in the *SymbioCity Approach*.

Further, the *SymbioCity Approach* provides in-depth guidance and tools on specific thematic areas, e.g. gender inclusion, poverty alleviation, place-making, strategic urban leadership etc which are described in separate knowledge products.

The working process should be documented for communication, dissemination and transparency purposes, including activities undertaken, issues raised and discussed, conclusions reached etc. Notes and written narratives complemented by illustrations, photos, graphs and maps are encouraged. Approaches, methods and tools for awareness raising, communication and dissemination are key, and available methods should be identified at the early stages.

6.1 STEP 1
Define and organize the process



Before initiating the planned intervention, it is crucial to think through and organize the process itself. This includes defining the intervention's purpose and scope, understanding the rationale behind it, identifying participants and stakeholders, and defining the methodology in detail. Consideration should be given to what human, financial or technical resources will be needed and can be made available.

A well-structured planning process promotes clarity and transparency, keeps aligned with the objectives, and results in time and cost efficiencies. Further, a well-organised process promotes ownership and buy-in among participants and stakeholders, including departments within a local authority.

Guiding questions to organize the initial work can include:

- What is the purpose of the intervention, e.g. what type of plan is produced?
- How will this purpose be achieved, and by when should it be done? What should the workplan include?
- Who should be involved in the process and how should the planning team be set-up and organised?
- What resources are needed for the planning process, e.g. human, equipment and budgets?

Setting up the team

Identifying who should be involved in the process, and why, should be done at the outset. In many situations, there will be different types and levels of engagement across various stakeholders. De-

pending on the context, originator, complexity and type of intervention (or desired outcome) the organizational structure will vary but would typically include three tiers.

A steering group (or political/decision-making body) is established with the ultimate responsibility and oversight function of the initiative. This is where key strategic decisions are made, from initiation to endorsing outcomes. Within a local authority, the political level must be involved, providing a clear mandate, instructions and support to develop the plan. Depending on the scope and complexity of the initiative, other levels of decision-making can be considered.

A working group (or task force) is responsible for the substantive work of the assignment or task, e.g. producing the plan, undertaking the review etc. The group should preferably be multi-disciplinary, including expertise representing different thematic fields, interests or organisations and entities. Within a local authority, departments with different responsibilities can be identified.

Figure 6.3
Examples of organisational structure in development processes ensuring multi-level cooperation and local engagement.

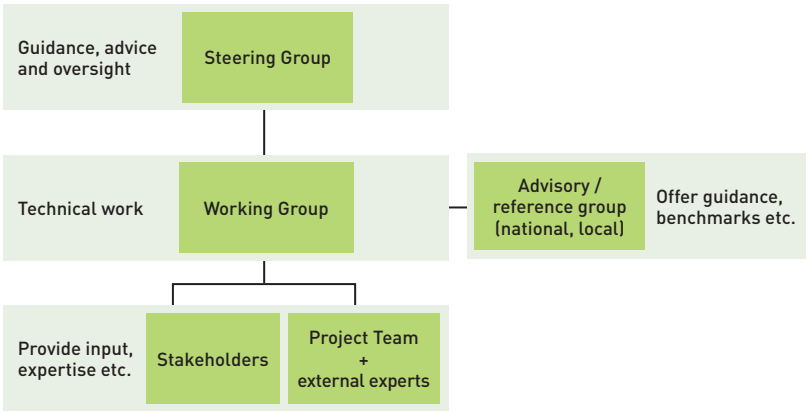


Figure 6.4
Possible organisational structure for a larger development project, example from SymbioCity Ethiopia.

There should be continuous two-way communication between the political/decision-making body and the working group, to address potential bottlenecks and monitor progress. The working group is typically led by a designated project manager, a focal point, or similar.

Advisory or reference group(s) can include representatives from the community, civil society, academia, the private sector etc, and is a good way of ensuring a collaborative way of working. This is not a homogenous group, and the role and interaction would vary depending on the purpose, type and stage of the planning process. It is also not a static group; the composition will evolve over time as the project takes shape.

An integrated and inclusive approach must be reflected in the way the team is set up and organized, including the assignment of roles and responsibilities among different stakeholders.

Stakeholder mapping and participation

In many cases it is useful to identify stakeholders that have an interest in or are directly (or indirectly) impacted by the planned intervention. Stakeholder mapping and analysis is undertaken in the initial stages to help identify who they are (incl. their potential interest in the intervention) and what role they can play. Types of stakeholders can include organizations, communities, businesses, departments, religious or political groups, or individuals. The identified group can be revised during the process.

The community is one of the most important stakeholders and can be a highly diverse group. Identifying the right level and means of engagement at different stages of the process, requires careful consideration. Community participation is beneficial in all stages of the intervention, from planning and implementation to the management of urban areas.

Engagement of citizens and other stakeholders helps inform the process, for example in data collection.

Communication and transparency

Creating an open and transparent process where two-way communication and information sharing is fundamental to building trust, as well as, informing, involving and motivating stakeholders. A communication plan helps structure the way communication is made, and when in time. Social media, newspapers, websites etc. are typical means for mass communication, while sharing meeting minutes, holding public meetings, organizing exhibitions, workshops and site visits are as important. The communication plan should strategically and proactively consider the purpose of communication, what to communicate and when, and to whom (the target group/s).

Planning the work

The establishment of a workplan provides a road map and effective guidance to arrive at a well-formulated and implementable

intervention, e.g. plan, project or review. As the project evolves, the workplan should be revisited and adapted so that it provides up-to-date guidance for joint planning. The workplan should consider the purpose and scope of the project, detail the anticipated activities to be undertaken, and inform on the necessary human, technical and financial (budget) resources needed to complete the intervention. The workplan should outline a realistic time schedule for undertaking identified activities. A clear workplan supports ownership and engagement during the process.

A GANTT chart (or activity schedule) is a typical way of planning the work, also indicating key milestones and when decisions are to be made. The chart should also embed key participatory, stakeholder engagement and communication activities.

The schedule can include different types of information, including main- and sub-activities (upper part of figure 6.6) that align to the three loops and cyclical principles. The schedule should indicate a realistic time allocation for each step, which may vary depending on purpose, scope and complexity of the intervention. The lower part illustrates when meetings, public engagement, or decision-making should take place.

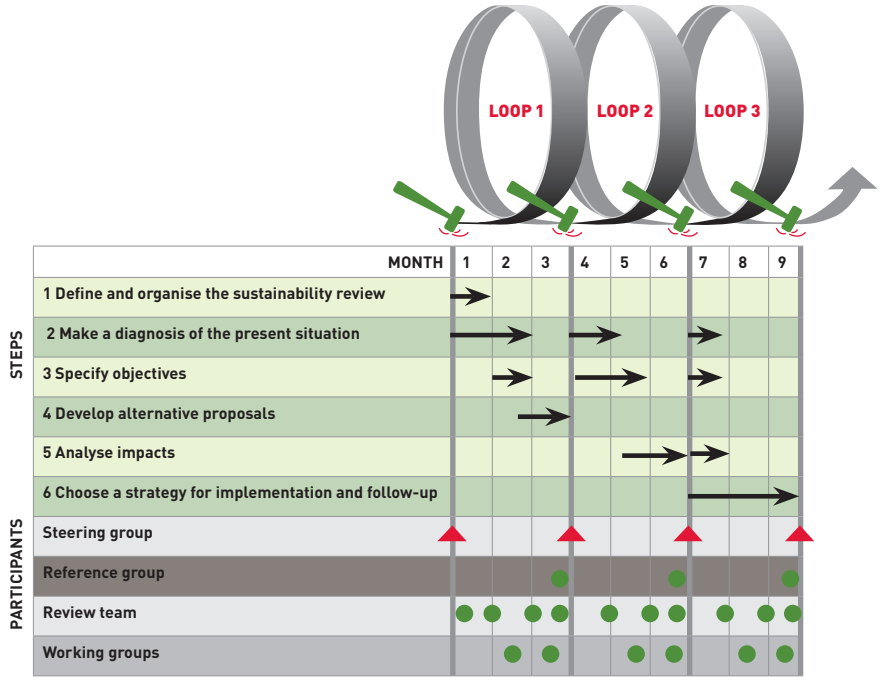
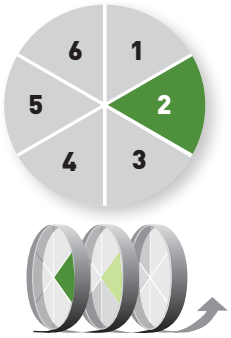


Figure 6.5
When organising a planning task or a sustainability review, an organisational chart and time schedule should be developed.

KEY TAKEAWAYS

- An integrated and multi-disciplinary approach relies on engaging relevant expertise to capture environmental, socio-cultural, economic and spatial dimensions to development.
- Stakeholder mapping identifies relevant stakeholders and communities that may have an interest in the intervention, and that directly or indirectly can be impacted.
- Reference and advisory groups can support the process, when relevant, by providing insights, in-depth expertise or for alignment of the intervention to institutional and regulatory frameworks.
- Resources to undertake the work, including implementation of the planned intervention, should be identified from the outset, including financial, human and technical resources.
- Organising the work should consider realistic timeframes, phasing and tangible activities for the work to be motivating, including and targeted.

6.2 STEP 2
Diagnose the present situation



An integrated, holistic and inclusive planning approach can be performed on different urban scales, for various purposes and desired outcomes. A thorough understanding of the context is achieved by investigating, describing and documenting prevailing *environmental, socio-cultural, economic* and *spatial features*, both challenges and assets. This will allow the identification of relevant responses and action, as well as informed, evidence-based decision-making.

Diagnostics for strategic plans would typically require a broader analysis, while specific interventions and projects have a more narrow focus. Understanding the roots and causes of identified challenges helps identify integrated responses and solutions. Rather than covering everything in the analysis, community participation and stakeholder consultation are methods to identify (and verify) which issues are important in the local context, and to help determine their priority. Discussing assets and opportunities (e.g. of a neighbourhood) is also key in motivating participation among stakeholders. Some of the aspects related to conducting a situation analysis and diagnosis are described below.

Data collection and analysis

Understanding the current situation builds upon the gathering and analysis of data, i.e. fact-finding. Data on *environmental, social, and economic conditions* that is of relevance for develop-

Figure 6.6
The diagnostics should capture environmental, economic and socio-cultural aspects.

SOURCES OF DATA COLLECTION

- **Primary:** typically include interviews, observations and surveys
- **Secondary:** typically desk-top studies, reports, policies, plans and academic literature
- **Open source:** typically freely accessible on public websites and platforms

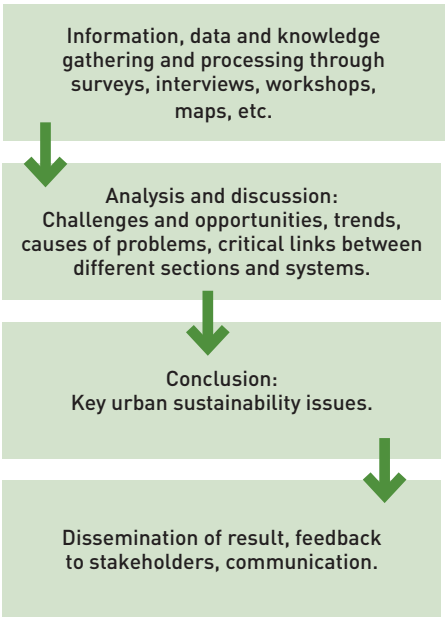


Figure 6.7
Typical steps in data collection and analysis for an urban development intervention prior to formulating visions, goals and solutions.

ment of the intervention (area or project), and for overall sustainability considerations should be collected. Some caution is advised, as extensive data gathering and analysis risks burdening the process, and may ultimately prove to be of limited value.

Data can be both *quantitative and qualitative* and drawn from various sources. Gathered data should be verified and quality-assured in terms of reliability and validity to provide sufficient evidence to make informed decisions. Open-source data can also be used where relevant and sufficiently reliable.

For more complex spatial planning or review contexts, data collection, triangulation (further proofing) and the use of Geographic Information Systems (GIS) helps create maps and diagrams illustrating the urban dynamics while providing spatialized evidence for further planning. Combining different sets of data (in layers) enhances the understanding of complex urban environments and in making necessary analysis. Typical data sets can include land-use, greenery, mobility and transportation patterns, infrastructure and energy, water and waste, social and economic places and activities, income distribution, location of industry and commercial functions including marketplaces, cultural heritage sites, etc.

Illustrating the relations and dependencies between different urban functions and systems is useful to identify potential synergies and conflicts, but also to communicate and discuss findings. For larger territories, *regional connection diagrams* can help illustrate the relation between an urban area and its hinterland, including adjacent towns and rural areas. Where feasible, site visits and interactive workshops can be used to verify findings with urban stakeholders. While digital technologies are accurate and useful in more complex situations, manually produced illustrations (drawings) are equally valid.

Understanding both negative and positive features

The purpose of data collection is to map and understand the current situation, key challenges, possible trends and tendencies of relevance for the intervention. A *SWOT analysis* (Strengths, Weaknesses, Opportunities, Threats) is valuable to organize and document findings and to determine priorities and identify key sustainability issues.

Strengths and weaknesses are usually specific to the area (internal), typically reflect the current situation, and can include e.g. environmental, economic and cultural issues. Opportunities and threats can be both internal and external aspects, also reflecting future events and scenarios. A SWOT analysis provides a balanced understanding of the prevailing conditions as well as an indication of what needs to be addressed. At this stage, the development potential, including key aspects and possible objectives, start to emerge.

Engaging expertise and representatives from different sectors in

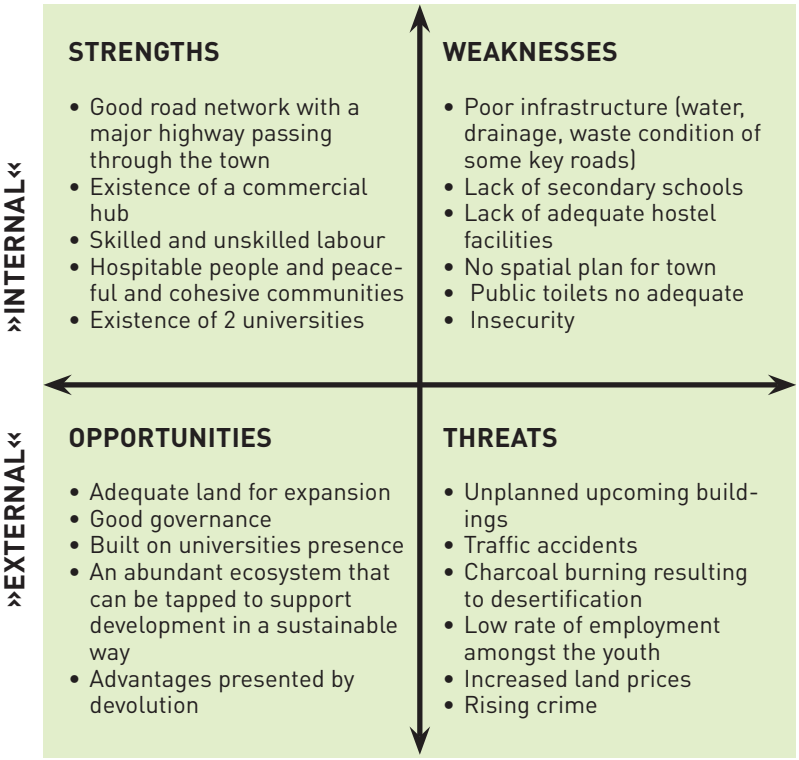


Figure 6.8
Example of how a SWOT Analysis can be structured.

the analysis can help create a good understanding capturing a diverse set of issues. Experts that are not familiar with the specifics of a particular context can add value and objectivity to the process.

If needed, the analysis can delve deeper into certain aspects. For example, if the project aims to address air pollution and improve the environmental situation, a more systematic analysis and assessment of the underlying causes can be undertaken. This can, in turn, help inform priorities and possible actions.

City District	Traffic noise	Industrial air pollution	River water pollution	Ground water pollution	Radiation
West	1	2	1	3	5
South	2	1	1	3	5
Central	2	4	1	3	5
East	3	2	1	2	5
North	2	3	2	3	5

Figure 6.9
Overview of initial diagnosis of the urban environment. The example uses the following grading:
1. **Seriously hazardous as a result of brief exposure**
2. **Hazardous as a result of long exposure**
3. **Safe, but unpleasant or irritating**
4. **Comfortable**
5. **Very comfortable.**

Understanding the spatial context

Understanding the urban structure and fabric, including the spatial distribution of urban functions and systems as well as historical and contemporary layers, helps reveal aspects that have influenced the environmental, socio-cultural or economic situation. For example, certain features in the spatial context may represent a particular time or movement expressing the vision and needs

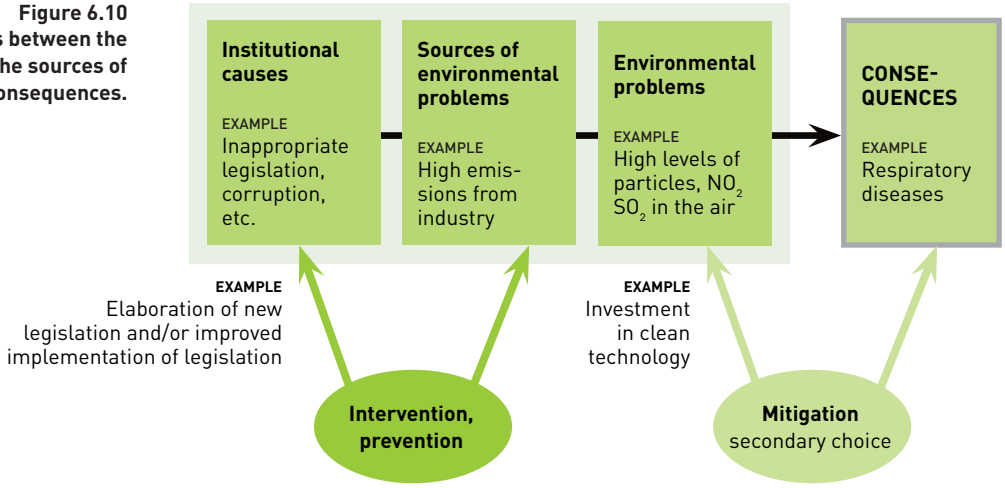
of the time. Visualising and describing existing typologies, spatial characteristics and cultural layers of an urban area illustrate how development has evolved over time. This may contribute to understanding both qualities and challenges in the urban fabric.

Understanding causes, sources and consequences

The analysis of a particular urban area should be based on available data and information, where the causes, sources and consequences of a particular issue should be observed and noted. Environmental and health implications may have several sources, all of which should be identified when addressing a particular issue.

A *problem tree* is a useful tool for illustrating the relations of causes and effects, and can be done with local stakeholders who normally experience the effects and have a good idea of the causes.

Figure 6.10
Illustration of the linkages between the causes of the problems, the sources of problems, and their consequences.



An integrated approach to diagnosis

Diagnosing the current situation should be based on an integrated and holistic approach and consider various aspects to achieve a comprehensive understanding of opportunities, challenges and constraints. The interface and linkages between various aspects and systems is of importance, as examining single issues or assets in isolation should be avoided. While the diagnostics primarily aim to capture and describe the situation in a particular area, it might be useful to relate the findings and outcomes to national, regional or global contexts, not least to establish benchmarks.

The diagnostics and analysis should include the institutional environment, e.g. the legislative and policy frameworks, which might pose barriers or present opportunities in addressing identified issues. Some causes might be internal, e.g. related to a local authority, hence potentially easier to address. Other causes might be due to external factors that are more difficult for an intervention to directly influence or address. Such issues should still be

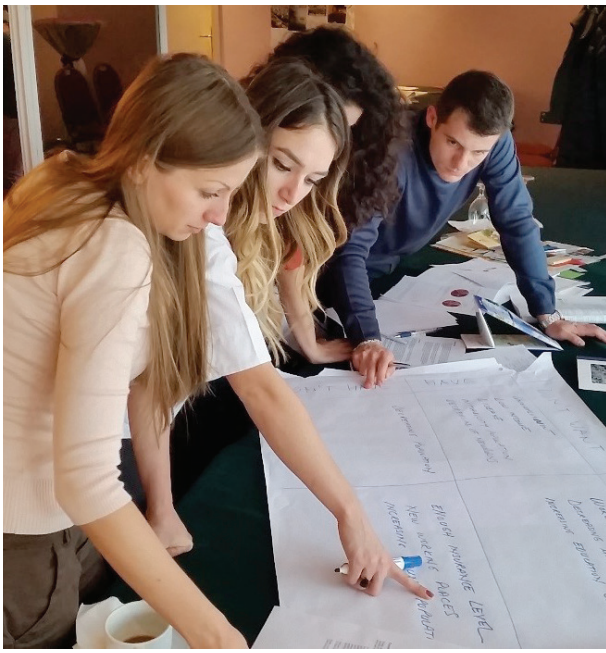
included and recorded. The interface between internal and external factors is sometimes unclear, but should be defined as far as possible.

Documentation and dissemination

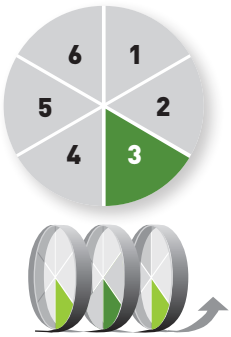
Documenting and recording the findings from the diagnostic face is essential, as reference for further work and to disseminate the outcomes and results. However, some analysis might be technical in nature, where consolidating findings may be valuable to facilitate discussions and enhance understanding among laymen and decision-makers.

KEY TAKEAWAYS

- Targeted data collection and analysis, including environmental, socio-cultural, economic and spatial aspects, contributes to a thorough understanding of the current situation, identifies key issues and priorities and helps inform decisions.
- Analysis and diagnostics should consider key characteristics, challenges and assets, to help identify potential synergies and promote integrated solutions.
- The diagnosis can include both internal and external factors, where aspects that can be managed within the planned intervention are distinguished from those that are beyond influence or control. The two are equally important to consider for successful outcomes.
- Identifying the root causes or sources to issues or challenges can contribute to more sustainable solutions, rather than only addressing the symptoms or effects. This is of particular importance for matters related to health, safety, comfort and quality of life.
- Engaging with a range of stakeholders and communities builds upon existing foundations and contributes to a more comprehensive understanding of the prevailing context, including local needs and aspirations.



Stakeholders prioritising issues when analysing the project area.



6.3 STEP 3
Setting visions, goals and objectives

Creating a joint understanding of a desired urban future contributes to identifying the broad pathway moving forward. Setting a vision with supporting goals and objectives, agreed upon among stakeholders, will steer planning and project development in an inclusive direction. Setting this direction can be done at different levels:

- A **Vision** provides an image of the desired future, for example in a 25 year perspective.
- The Vision is often operationalized through one or several **Goals** which set out the strategic areas of interventions for reaching the vision in the medium term, for example 3-5 years.
- **Objectives** are concrete, measurable outcomes that specify the goals and turn the vision into action in the short-term (~1 year).

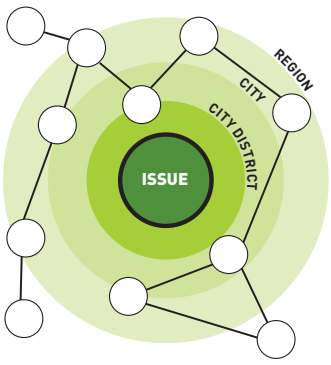


Figure 6.11
Schematic illustration of a mind map, where the identified aspects also are related to different urban levels.

The vision, goals and objectives are informed by the diagnosis, and should preferably be made prior to developing detailed proposals or solutions. Objectives can be both quantitative and qualitative, but are more specific than goals. Targets and indicators can be attached to the objectives, as a way to set benchmarks and monitor progress.

The vision, goals and objectives typically relate to the specific intervention and should be aligned to overarching visions (e.g. for a town) or objectives that already are defined in existing policies and plans. Any deviations or differences should be identified, discussed and resolved.

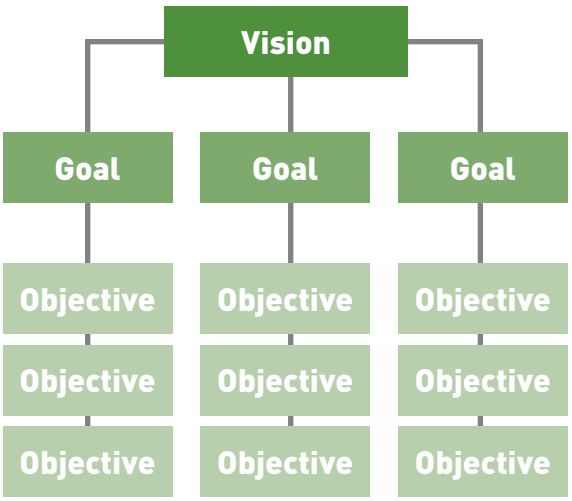


Figure 6.12
Example of how a vision can be supported by a set of goals and objectives.

Developing a shared vision

The insights and understandings derived from the analysis and priorities previously identified, are used to shape a possible development direction for the intervention. This direction is expressed as a »vision«, a guiding statement for long-term, strategic planning and a constant reference and motivation for stakeholders, communities and leaders.

The understanding of urban sustainability and how this translates to, and can be articulated in, a particular local context can be further explored linked to the vision statement. Relating the local definition to national, regional and global contexts can be valuable.

Example of vision: »By 2050, the urban area is green, vibrant and inclusive for all!«

Establishing key issues for further planning

Based on the analysis and diagnosis, a set of key issues are identified to inform further planning, which can be derived from clustering outcomes from e.g. the SWOT analysis. Identified key issues should relate to the vision statement and the definition of urban sustainability.

Setting goals, objectives and indicators

The agreed vision and key issues provide the basis to set relevant goals and objectives. The level of detail depends on the type and scope of the intervention that is being developed, e.g. a plan, review or project. However, the goals typically relate to overall development of an urban area and how enhanced sustainability will be met, while objectives relate to specific interventions or actions.

Goals and objectives should be formulated in such a way that allows for multiple solutions to emerge, and that captures the needs of different groups. Each objective also needs to have:

- An indicator describing if the objective has been achieved, and;
- A target indicating the objective should be met, and to what level.

Targets and indicators make objectives SMART, i.e. Specific, Measurable, Agreed, Realistic and Time-based. Further, targets should be formulated as ratios, or principles, that are not dependent on a particular technical solution, but rather allows for development of alternative, innovative solutions. Indicators can be used for various purposes, including the formulation of targets, monitoring implementation progress, and evaluating results and impact.

Establishing baselines is helpful to measure the current situation, i.e. what the indicators and targets are measured against.

A *planning indicator* is related to spatial planning[49], and facilitates the formulation of targets to enhance sustainability in a particular area. Planning indicators describe future conditions in

[49] Ranhagen, U and Trobeck, S, 1999, The use of indicators in spatial planning. A situation report. The National Board of Housing and Planning and the Swedish Environmental Protection Agency.

the same terms as the current situation, which then serves as a baseline, e.g. when describing:

- Planned proportion of the urban area with a bus stop or train station within x metres, relative to the current proportion
- Planned proportion of protected green areas for recreational use, relative to the current proportion.

Many indicators are field indicators that reflect the state of e.g. the aquatic life in an ecosystem. The related planning indicator could be »the area of coherent, protected water bodies in the area that preserve aquatic life«.

KEY TAKEAWAYS

- A vision represents a desired urban future and contributes to outlining the broad pathway moving forward.
- An agreed vision with supporting goals and objectives will steer planning and project development in an inclusive direction.
- Goals and objectives operationalize the vision, and should allow for multiple solutions to emerge, meeting the needs of different stakeholder groups.
- Set objectives should promote sustainable environmental, socio-cultural, economic and spatial development, where indicators and targets describe if an objective has been met, when, and to what degree.
- Goals and objectives for the planned intervention can help operationalize visions and strategies on a higher level, e.g. city-wide or national.

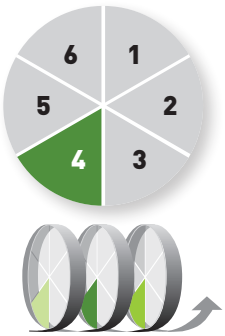
SUSTAINABILITY INDICATORS FOR TANGSHEN ECO-CITY, CHINA

The overall vision of the Tangshan Eco-city is to be a world renowned, modern, people-focused, prosperous, climate-neutral and environmentally sustainable society. The indicator system of the Eco-city will guide and support the process of planning, design and production, and operating the Eco-city to fulfil this overall vision. The indicator system includes indicators on three spatial levels: the city level (30 km^2), the city district level (12 km^2) and the block level. The indicator system is relevant for both environmental and socio-economic sustainability.

It includes both planning and monitoring indicators related to environmental, socio-economic and spatial goals, with a focus on the planning phase and an integrated approach to the urban systems of the city. The complete indicator list has 140 indicators, and 30 indicators have been selected for management level information.

LEGEND	
Chinese standard by improvement factors	Factor 2 = Target level two times better than reference
Environmental goals	
Socio-economic goals	
Spatial goals	
14. Excess speed	

INDICATORS	TARGET LEVEL	FACTORS	GOALS
Urban functions			
1. Density	x persons/sqm		
2 Living space	x sqm/person		
3. Local accessibility to service	100% of housing areas		
4. Function mix	100% urban nodes		
5. Affordable housing	>5%		
6. Houses in risk areas	0%		
Urban space			
7. Urban environmental quality	100% of housing areas		
8. Block size	60–100 m		
Building and architecture			
9, Sustainable buildings	100% of buildings		
Traffic and transport			
10. Non motorised local transport	>50%		
11. Regional travel by public transportation	>70%		
12. Location strategies and parking restrictions	100% of city districts		
13. Time difference ration bike/car and public transport/car	<1,5 time		
14. Excess speed	0%		
Energy			
15. Energy demand	10 000 kW/capita	Factor 2	
16. Renewable energy	95%		
Waste			
17. Collection of City hazardous waste	100%		
18. Recycling	100%		
19. Reuse and recycling to agriculture	>90%		
Water and wastewater			
20. Water consumption	100–120 litre/ person/day		
21. Water reservoir for drinking water	> 90%		
22. Sanitation coverage	100%		
23. Separated wet sanitation	>90% of buildings		
24. Water quality	100%		
25. Stormwater collection	>90%		
Landscape and open space			
26. Public green	20 sqm per capita		
27. Local accessibility to park and public space	100% of housing areas		
28. Preserved farmland	100%		
29. Preserved and restored wetland	100%		
30. tree cover	50%		



6.4 STEP 4
Develop alternative solutions

Integrated approaches to urban development and planning suggest that goals can be reached through a combination of solutions and actions. Rather than formulating a project, integrated solutions include interventions in several sectors and by different stakeholders. This broader, holistic approach results in more innovative outcomes leveraging resources through collective action.

Taking an integrated and programmatic approach

Contributing to sustainable development in an urban area requires effort on many levels. The benefits of an integrated approach implies that different sectors and stakeholders can contribute toward the same goals. There is also high potential for synergies between different systems. An integrated solution with multiple components is far more likely to result in change and transformative impact, while delivering multiple benefits. Rather than developing a project, it is recommended to consider different actions across sectors, stakeholders and time to reach the agreed goals.

Figure 6.13
Four alternative pro2posals from the planning phase of the Loudian Town in Shanghai.
Sweco 2001

KEY FACTS

INTEGRATED APPROACHES TO IDENTIFYING SOLUTIONS:

- adopts a programmatic rather than a project approach, consisting of several different components.
- cuts across sectors (such as water, transport or waste) and time (by suggesting short, medium- and long-term responses).
- considers collaborative efforts where various stakeholders are involved, contribute and play an active role.
- ensures that solutions are inclusive (meeting the needs of different groups) and are developed in a participatory way.
- consider different ways of reaching set goals for the intervention.
- compares and assesses the benefits and disadvantages of alternative scenarios or options to identify the right approach.

Develop alternative proposals

The development of possible solutions or responses should be informed by the diagnosis and objectives set for the intervention, acknowledging that there might be a wide range of relevant alternatives to consider where synergies between systems and

sectors can be identified and harnessed. In many contexts, for example in urban planning and development, predicting what the future holds and understanding the drivers of change that influences the way an urban area functions or can develop, is complex. Thinking ahead while acting now is difficult, hence integrating possible future scenarios in urban planning processes is critical, especially in view of ensuring climate action, enhancing resilience etc.

Alternative solutions should be considered from a sustainability perspective, in ensuring viability and effectiveness over time, including operations and maintenance. Rather than immediately agreeing on a particular solution, project or planning option, the development of alternatives and scenarios is useful to assess flexibility and possibilities for phasing and upscaling. Evaluating potential solutions, including their costs and benefits in the short, medium and long term, is useful for comparison of impact between easier, cheaper, short-term improvements against more expensive and long-term interventions that ultimately might be more sustainable.

Selected solutions should prevent problems rather than addressing their effects. Where this is not possible, it is justified to mitigate negative effects via measures that improve rather than replace existing technology (e.g. catalytic converters to reduce air pollution). Choosing the right strategy is important, as mitigating actions can be less costly and more practical in the short term, while delaying the implementation of longer-term sustainable solutions.

Scenario planning, for example *Backcasting* or the *Foresight methodology*, can be used to develop alternative solutions that are integrated and optimal in response to a particular issue.
Scenario planning can be applied e.g. when assessing alternative urban structures and typologies, land use and its efficiency, nature-based solutions or the use of resources. A scenario matrix guides the identification and illustration of various scenarios, for example by plotting extreme positions against each other (polycentric urban structure vs monocentric, concentrated vs scattered, centralized governance vs decentralized governance, high density vs low density), and to explore the benefits and consequences in relation to set goals and objectives. The final option may eventually be a combination of different scenarios.

Scenario planning in Ukraine, exploring and mapping alternative strategic directions for multiple plausible futures by identifying trends, uncertainties, and strategic implications.

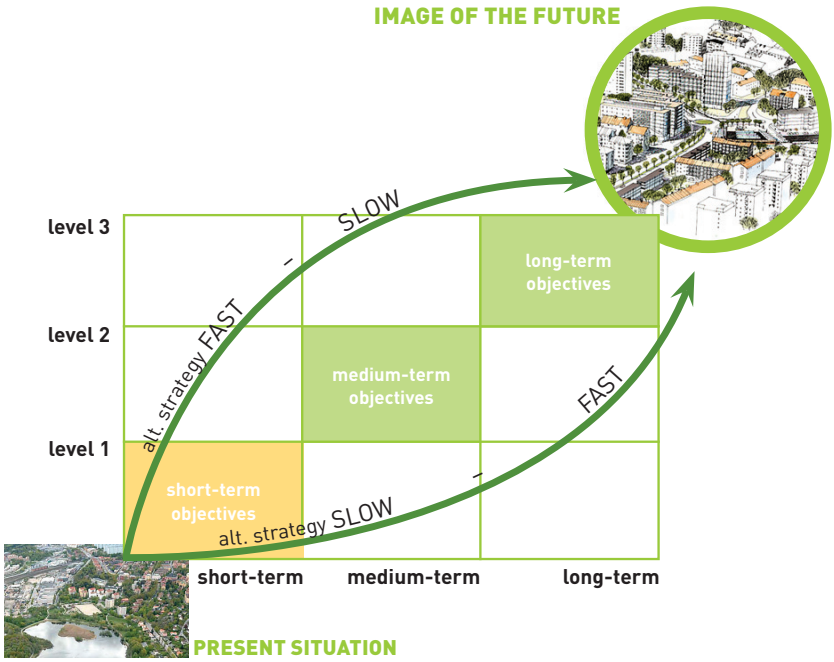


Figure 6.14
Diagram of the backcasting process: A future image of the urban environment is developed from objectives, where level 3 represents a long-term objective (e.g. 2050), level 2, a medium-term objective (e.g. 2030) and level 1, a short-term objective (e.g. 5 years). By relating the future image to the present situation, two alternative strategies for development can be identified
• FAST-SLOW – considerable investment in the short term, with less investment in the medium and long term
• SLOW-FAST – limited investment in the short term with considerable investment in the medium and long term.

KEY FACTS

BACKCASTING – ITS LOGIC AND VALUE AS A METHOD

Backcasting is a method for envisioning new innovative systems and solutions focusing on synergies between different urban systems and institutional factors. Backcasting involves imagining a sustainable future situation, without fully considering preconditions and restrictions imposed by current obstacles and problems. This future image includes different sustainable systems, e.g. transportation[50]. The future image is then related to the present situation from which pathways are identified to reach the desired future situation. Hereby, short, medium and long-term solutions can be identified.

Backcasting is useful for both large and small-scale improvement of urban areas and for envisaging possible future scenarios without being restricted by present constraints. It shifts the focus away from often overwhelming problems, and can provide the basis for a balanced and realistic relationship with the future[51].

Identifying essential synergies between different urban systems

Integrated, inclusive and holistic urban development contributes to identifying synergies between different urban systems of functions in a development intervention. When developing alternative proposals or scenarios, identified synergies can contribute to:

> avoiding sub-optimisation when a solution can solve two or more problems, which usually also has cost benefits.

[50] A thesis on backcasting is: Wangel, J (2012). Making Futures – On Targets, Measures and Governance in Backcasting and Planning for Sustainability. Doctoral Thesis in Planning and Decision Analysis, KTH Royal Institute of Technology, Stockholm.

[51] Jönsson, B (1999) Tio tankar om tid. Bromberg, cited in SAMS (2000).

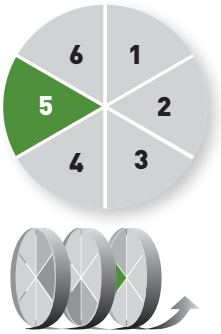
> promoting a multi-disciplinary approach across sectors, facilitating knowledge sharing and collaboration, which is vital to achieve a cost-efficient and smooth planning process.

When developing alternative proposals or solutions, the *Symbio City Approach* considers urban systems that typically could be relevant for exploring potential synergies. Optimally, an integrated approach builds upon synergies that contribute to environmental, social and economic benefits.

KEY TAKEAWAYS

- Working with alternative scenarios (or solutions) explores different pathways to reach set objectives and supports identification of integrated solutions for optimum benefits and cost-efficiency.
- Alternative solutions should align to set vision and objectives, be sustainable and ensure viability and effectiveness over time, including operations and maintenance.
- Different scenarios offer various degrees of flexibility for phasing, upscaling and modification over time, to be balanced against current and future needs as well as available resources.
- Identified solutions should preferably address the causes of prevailing challenges. Only addressing the symptoms or effects should be avoided, although it should be recognized that mitigative measures are necessary at times.
- Adopting a programmatic approach implies working collaboratively with several components in parallel, across different sectors, and where responses are made in the short, medium and long-term.

6.5 STEP 5
Assessing benefits and impacts



Different solutions will have varying social, environmental and economic impacts, and relevant scenarios and options should be continuously assessed in order to maximise the positive impacts while minimizing the negative. The earlier negative impacts can be observed, the more likely the project design can be revised accordingly.

Assessing benefits and impacts is done as part of the project design, and not something which happens after a plan or project has been agreed or finalized. Once the preferred planning scenario or project option has been identified, a more targeted and detailed assessment will be necessary, potentially including environmental and social impact assessments and economic implications.

The *economic, social, environmental and spatial benefits and impacts* should be evaluated as a basis for informed decision-making. While assessing several possible alternatives is preferred, it can also be done for a single alternative. Impact analysis is also

KEY FACTS

ASSESSING BENEFITS AND IMPACTS CAN BE GUIDED BY WHETHER THE OPTION:

- Meets set objectives
- Is inclusive for different groups
- Delivers the maximum benefits
- Has the least possible negative impacts
- Addresses the root problems (rather than addressing symptoms)
- Is feasible and realistic in terms of risks, implementation, budget, political will etc.

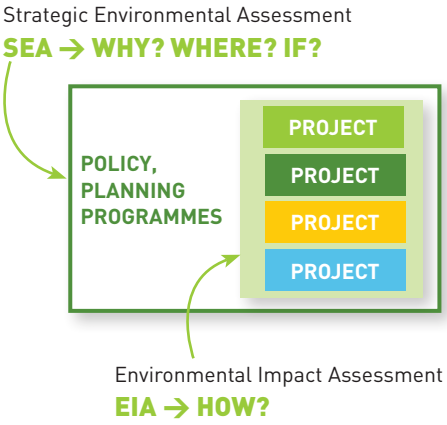


Figure 6.15
SEA focuses on the strategic level (policies, plans, programmes), while the EIA often focuses on projects.

a core function of urban sustainability reviews. Such reviews, or sustainability assessments, are typically broad and generic in the way contexts or proposals are examined from a sustainability perspective. Assessments can cover both strategic and project levels, and the scope of assessments will differ depending on the objectives, the particular situation and the type of intervention or proposal being assessed.

Assessments of benefits and impacts can be made using a variety of methods and tools depending on scope and context, and may look different depending on the legal framework, policies and the planning praxis in different countries, regions and cities.

Assessments linked to the legislative environment

In general, programmes, plans and projects with extensive consequences from a sustainability perspective require comprehensive and detailed assessments. In projects with limited impact, assessment may be very brief.

Environmental Impact Assessments (EIAs) is a proven tool with a good track record in evaluating the environmental risks and opportunities of projects. The methodology is also applicable to limited urban development plans, including socio- cultural and economic impacts.

Strategic Environmental Assessment (SEA) is the collective term for methods and tools focusing on the analysis of the environmental impact of policies, programmes and plans on a strategic level, however also including socio-cultural and economic perspectives. The SEA's strategic orientation is especially valuable when assessing comprehensive alternatives (or proposals), reviewing sustainability performance etc for larger urban areas and with a long-term perspective. The SEA can help identify and assess probable or potential negative effects, and question established however unsustainable paradigms and assumptions. Also in SEA's, assessments should be made when it is still possible to modify proposed solutions. A SEA is not a purely technical procedure but a dynamic process that includes consultation with various stakeholders. A well-managed SEA process can also contribute to increasing awareness and involvement in sustainability and environmental concerns, and hereby, generate new insights and solutions.

In simple terms, the SEA's focus is mainly in response to the questions »Why«, »If« and »Where«, while the EIA responds to »How«. Depending on the nature and scope of a plan, intervention or project, impact assessments can also be prepared with a specific focus, for example on cultural heritage, urban landscapes, social issues or children and youth.

Comparing different scenarios and project components

There are several practical tools for comparing different scenarios and project components.

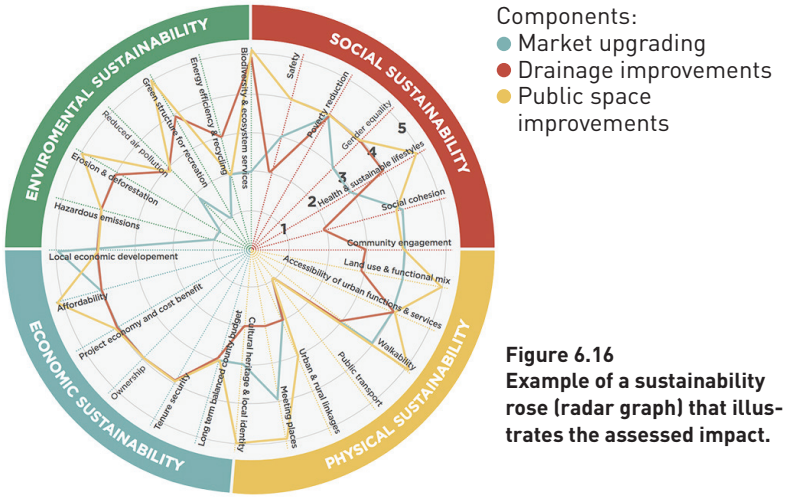


Figure 6.16
Example of a sustainability rose (radar graph) that illustrates the assessed impact.

The sustainability rose (spider diagram, radar graph): Selected indicators of relevance are placed on the radial axes of a circle. The indicators can be clustered according to their environmental, economic, socio-cultural or spatial nature, unless being used for a single issue only, e.g. ecological aspects. Indicators are graded with optimum performance at the circumference (e.g. 3, 5 and 10) and minimal performance at the centre of the circle.

Other, similar tools include effect profiles or ranking diagrams, where the expected performance of different alternatives is measured against a set of indicators.

Stress-testing a project: To avoid planning and designing unrealistic projects, it is useful to stress-test the project at an early stage. This involves asking simple questions about each project component and ranking them in terms of feasibility. In this way, unrealistic components (or projects) can be ruled out.

Subject	Access to Land	Permits	Mandate	Investment	Operations	Time	Tech capacity	Political support	Public acceptance	Necessary Partnership
Park bench	😐	☺	☺	☺	☺	☺	☺	😐	☺	☺
Landfill	☹	😐	☺	☹	😐	☹	☹	☺	☺	☺
Eco-toilet	😐	😐	😐	☺	😐	☺	☺	😐	☹	☹

Figure 6.17
Example of an initial assessment (stress-test) of a project.

Multi-criteria analysis (MCA): A systematic procedure to analyse (weigh) the effects of different alternatives. MCA is often used for more complex evaluations, as the selected indicators are weighted and their performance is graded. The two factors are multiplied to arrive at a score for each indicator. The indicator scores are then summed up for each alternative.

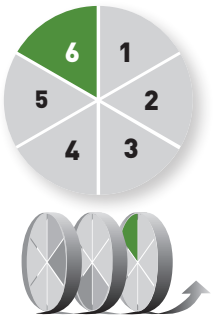
Arriving at the final proposal

A final proposal should be selected based on the assessment made of benefits and impacts. The final proposal can combine elements from several of the alternatives considered, or be derived from a

main alternative with additions and/or alterations from others. The final proposal should be balanced, avoiding sub-optimization and trade-offs of lower quality and be representative to the objectives.

KEY TAKEAWAYS

- Understanding the economic, social, environmental and spatial benefits and impacts of an intervention (or alternatives) aligns project design to set objectives and contributes to informed decision-making.
- Continuously assessing benefits and impacts can guide project development and design and allow for mitigating potential negative impacts at an early stage.
- Various tools and methods can be applied for assessing and evaluating interventions on both strategic and project levels, from complex SEA's, EIA's and MCA's to simple spider diagrams and radar graphs.
- Consulting urban stakeholders and communities can add valuable information when assessing benefits and impacts.
- To achieve optimum outcomes, final design of a project or intervention can include elements from different alternatives that have been considered.



6.6 STEP 6
Implementation and follow-up

The selected final proposal provides the base for establishing a strategy or action plan for an effective and targeted implementation and follow-up. Pathways for implementation will typically be informed by the scope, complexity and type of intervention or plan, as well as the context and regulatory and policy frameworks. In preparation of the implementation strategy, it's often valuable to think beyond actual execution, i.e. taking into consideration operations, maintenance, monitoring and follow-up – aspects that typically fall out.

Moving towards implementation

An implementation strategy or action plan should consider and integrate the dimensions of urban sustainability, i.e. socio-cultural, environmental and economic, from design and costing to execution and construction. Informed by the plan, project or intervention, an implementation or action plan typically builds upon a defined scope with associated work plan or schedule. It usually identifies and outlines key elements, steps and activities in a phased and logical order, covering the short, medium and long-term. Such an *implementation management plan* could include definition of structures, roles and responsibilities; internal and external pro-

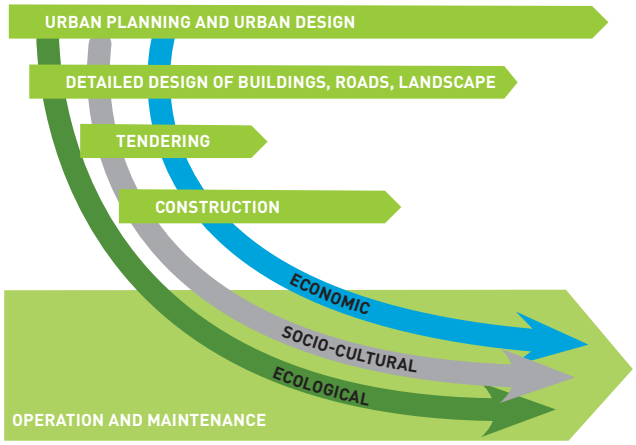


Figure 6.18
Key sustainability aspects and objectives should be integrated into all phases of planning, design and implementation.

cesses and meetings; communication and outreach; cooperation and engagement of stakeholders and the public, procurement and commissioning, monitoring and follow-up etc. It would also outline policies, principles and procedures, e.g. related to the procurement and use of environmentally friendly building material.

Implementation of plans or projects might require the definition of sub-projects (project components), e.g. soil preparation, planning of infrastructure, streets and public space, construction etc. Especially in larger, more complex urban development projects covering a longer time frame, *phasing of the development* needs to be considered for an effective execution and to avoid sub-optimisation. Identified synergies and sustainability aspects should be integrated and careful monitoring and evaluation of the initial phases can be used for adjustments and improvements for subsequent phases.

A pilot phase or demonstration project can be considered for this purpose, also offering an opportunity for stakeholders and the public to engage. Interventions can be implemented on a temporary basis to test certain solutions or approaches, and after evaluation, become permanent and catalyse long-term transformation. This is also referred to as »tactical urbanism«.

Financing implementation

A good plan or project is not worth much unless it's implemented. Ensuring the means for execution of urban interventions is paramount, including financial, human and technical resources. A sustainable funding strategy should be integrated in the implementation plan, and consider costs for project preparation, implementation, operations and maintenance to be successful.

City-wide strategies and plans are mechanisms to realise a city's long-term vision and overarching development goals, and should ideally be linked to the municipal budgeting cycle and investment strategy. Ensuring a balance of what is desirable and planned for and what can be financed is key, and financial re-

EXAMPLE

TIME SQUARE – TACTICAL URBANISM

The re-purposing of Times Square in New York, the US, is an example of »tactical urbanism« where the local government with support from surrounding property owners and businesses, made temporary changes in the traffic environment to improve conditions for the pedestrians, including the provision of plazas. The temporary arrangement showed a decrease in injuries and accidents, while an increase in pedestrians and retail sales. After a trial period, the changes were made permanent in 2010. The project was implemented in collaboration between the city and the property owners, and has since been inspirational for other similar interventions.

Source: New York Department of Transport / www.dezeen.com

sources should be allocated in the municipal budget for capital investments, operations and for maintenance. Implementation of city-wide strategies and plans typically run over longer periods of time, which requires not only a consensus over political cycles, but also a close collaboration and coordination among departments within a local government, as well as with other actors such as developers, businesses etc.

In cities and local governments, different options of funding can be considered typically through regular budgets or separate allocations. External funding is sometimes required for example through loans or grants, national level allocations, or through partnerships between different entities, e.g. private-public. Depending on scope, set-up and ownership, urban interventions can also be financed by private sector and developers, organisations and philanthropies etc. Different funding modalities are further described under chapter 5.

Operations and Maintenance

Aspects of operation and maintenance (O&M) should be considered in the planning phase, and include sustained, regular performance monitoring and periodic systems assessments. Maintenance and rehabilitation of interventions is made to ensure the sustained performance of systems and infrastructure assets. Negligence of operations and maintenance has often made otherwise good infrastructure projects unsustainable or shortened their design life.

Key for successful implementation of any intervention, project or plan is to identify potential technical, financial or natural risks that can influence either execution or performance during its operation. Ideally, such risks are identified already in the planning phase and should be continuously monitored, revisited and mitigated when needed. *A risk assessment and matrix* is useful for this purpose.

Likelihood \ Impact	Negligible	Minor	Moderate	Signifi-cant	Severe
Very likely	Low Med	Medium	Med Hi	High	High
Likely	Low	Low Med	Medium	Med Hi	High
Possible	Low	Low Med	Medium	Med Hi	Med Hi
Unlikely	Low	Low Med	Low Med	Medium	Med Hi
Very Unlikely	Low	Low	Low Med	Medium	Medium

Figure 6.19
Example of a risk assessment and matrix.

KEY FACTS

CONSIDERATIONS FOR PROJECT IMPLEMENTATION

- Preparation of clear planning documents
- Acquire key decisions, approvals and permits
- Resource mobilization and securing funding (investment, operations and maintenance)
- Communication and engagement of stakeholders and the public
- Detailed design and costing
- Procurement, works and commissioning
- Operational requirements and maintenance plan
- Monitoring, evaluation and follow-up

Continuous learning and improvement (Monitoring and Follow-up)

Ensuring that implementation is on track is key for successful outcomes. Monitoring primarily focuses on progress against strategic and operational goals, while evaluation measures overall impact against the vision. Frameworks for monitoring and evaluation not only informs on how improvements and adjustments can be made for the next phase or project, but also to understand the effects and impact from an intervention. Evaluation should thus be made against set objectives and goals, targets and sustainability indicators that have been applied in the planning and design phase, or against other benchmarks of relevance. Other useful references are e.g. EIA's or SEA's if such have been developed for the intervention. Analysing outcomes and impact from an intervention can also be done by engaging stakeholders and beneficiaries, not least to understand the user-perspective and how a certain intervention responds to local needs and aspirations including the perspectives of different age groups, gender etc.

In particular for strategies and plans on city or local government level, systems for monitoring and evaluation should align to *national monitoring frameworks* which can support comparative analysis but also to monitor local and national progress in implementing the SDGs. Such monitoring can be supported by e.g. national or international urban observatories.

Certification systems of the built environment are typically applied to enhance the sustainability of a project or building, but can also be used to follow-up to safeguard qualities defined in the planning processes. The criteria in these systems should be related to the targets and indicators as defined for the specific intervention. Other frameworks with a hierarchy of objectives, outputs, activities and indicators, e.g. the Logical Framework Approach, are useful for project planning, monitoring and evaluation.

Stakeholders examine the potential impacts of a proposed intervention, SymbioCity Myanmar.

EXAMPLE

ENVIRONMENTAL CERTIFICATION SYSTEMS

An environmental certification system is typically a third-party with verified standards and rating systems to assess the built environment's performance and sustainable practices, for example to safeguard qualities in the built environment, catalyse climate action, enhance resilience or make efficient use of available resources. Such systems can be applied ranging from individual buildings to urban areas, and include e.g. BREEAM (BRE Environmental Assessment Method), LEED, or Green Star. Several of these systems are adapted and aligned to national contexts and organisations and most are affiliated to the World Green Building Council.

https://worldgbc.org/

KEY TAKEAWAYS

- Urban development interventions can be implemented in phases, depending on complexity, available resources (incl. funding), and timing. Replication and scalability should be considered.
- Modalities and sources of funding should be considered from the outset, in order to ensure they are balanced with the project design.
- Implementation plans should integrate costing and financing options to support an effective execution, including operations and maintenance.
- Systematic monitoring and evaluation can be supported by indicators, including environmental, socio-cultural, economic and spatial aspects.
- Communication and stakeholder engagement is important both during and after execution of the project.

6.7 What happens next?

The *SymbioCity Approach* provides a conceptual approach and generic working procedure to guide the process of developing sustainable urban interventions that, if successful, can contribute to transformative change and impact.

Transforming urban areas and the built environment is complex and can take time. Successful interventions should therefore be considered for replication and scaling up, where the experience and outcomes in a sense can provide the »blue-print« for other, future interventions. Still, any intervention needs to be adapted to the conditions and needs of each separate context. For larger, more strategic and complex interventions spanning over a longer time frame, a continuous monitoring and follow-up is recommended and where updates or adjustments of the intervention, project or plan should be considered. Such learning can also inform revision of current strategies and policies, e.g. for a local government. Established partnerships and advisory groups can be useful in this regard, potentially also in support of bridging political cycles.

Against this backdrop, successful interventions provide the basis for dissemination of learnings and experiences, both to inspire other stakeholders and communities, build partnerships and collaboration, and to strengthen capacity and enhance awareness. Advocacy, communication and awareness campaigns on sustainable urbanisation can, and should, take place on different levels and through different channels – horizontally and vertically – from international and national, to local and communities. Also in this context, partnerships between different actors can be important. Documentation of both the process and outcomes is therefore important.

Moving towards urban sustainability is not only about successfully implementing projects and plans. Understanding the effects from a broader perspective is as important as interventions can trigger shifts for example in behavioural patterns and attitudes, the occupation and use of public space, flows and movements in the city. Urban interventions can also lead to changes for example in land values and property markets, willingness to invest, or in the conditions for businesses and commercial activities. The implementation of projects and plans can from these and other perspectives lead to transformational change and spin-off effects that impact the broader area or the entire city. Institutionalising successful approaches, processes and outcomes is therefore essential.

Further, in some contexts there are gaps between policy and regulatory frameworks and the realities on the ground. Continuous learning is key, and addressing such gaps can be informed by successful transformative interventions and best practices and influence the further development of the policy environment. Collaboration, coordination and exchange among stakeholders on different levels is central, including different levels of government, private sector, academia and other stakeholders.

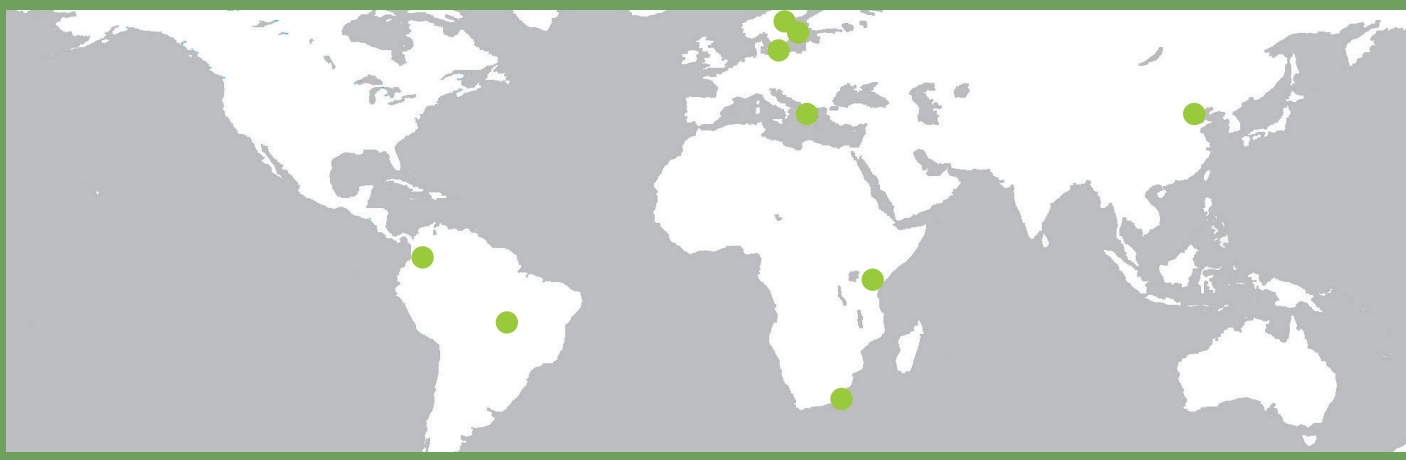
KEY TAKEAWAYS

- Experiences and learnings from successful urban development processes and outcomes should inform organisational development and be institutionalised.
- Advocacy and awareness raising on sustainable urbanisation is a continuous process, ideally engaging different urban actors from e.g. the public and private sector, academia, think tanks, organisations and others.
- Replication and scaling up of successful interventions should be considered, however always adapted and taking local conditions and needs into consideration.
- Advisory and reference groups e.g. related to an initiative or specific intervention, can contribute to building consensus, raise awareness and support bridging political cycles or other disruptions.
- Understanding the dynamics and changes in the city is key, as an intervention, project or plan can lead to spin-off effects and transformational impact beyond the scope of the intervention itself.

PHOTO Klas Groth

7.

GOOD PRACTICE EXAMPLES



GOOD PRACTICE EXAMPLES

THIS CHAPTER PROVIDES a brief introduction to a set of initiatives and projects that promote sustainable urban development. The examples illustrate how strategies and policies can be developed and implemented, as the basis for urban planning interventions on a more detailed level. They also illustrate possible linkages between different urban systems, and how synergies can add value to interventions.

Most of the examples have been developed and/or implemented outside the direct scope of the SymbioCity Approach. However, they illustrate the core values of the approach and show the broad range of entry points to enhance the environmental, socio-cultural, economic and spatial performance of urban areas.

Hopefully, the examples will inspire future urban development interventions, and thus contribute to analysis, assessments and reviews, the development of policies and strategies, and the formulation and implementation of integrated urban plans, master plans and detailed development plans, or individual projects.

THE EXAMPLES

1. Regional Development Plan for the Stockholm Region, 2050
2. »The Walkable City« (Promenadstaden)
3. Climate Strategies – Retreat, Defend, Attack
4. The Western Harbour, Malmö (Västra hamnen)
5. Stockholm Royal Seaport (Norra Djurgårdsstaden)
6. Urban Sustainability Review, Skopje, Macedonia
7. The Sustainable Community Concept, Nelson Mandela Bay Municipality, South Africa
8. Bus Rapid Transport Systems in Curitiba and Bogota
9. Tangshan Bay Eco-City, China
10. Climate Neutral Cities, Sweden
11. Mukuru Special Planning Initiative
12. Umeå, Gender Responsive Urban Development
13. Malmö in the making, Malmö

1. Regional Development Plan for the Stockholm Region, 2050

COUNTRY	**Sweden**
CITY	**Stockholm**
URBAN SCALE	**Regional level**
KEY ISSUES	**Regional planning, strategic planning, metropolitan area**

For more information, see **https://www.regionstockholm.se/**

BY 2050 THE STOCKHOLM METROPOLITAN REGION is expected to accommodate some 3,4 million inhabitants, an increase of over one million since 2015. This creates a number of challenges, positive as well as negative, including impacts on the environment and climate.

The vision for the Stockholm region is to become Europe's most attractive metropolitan region. Four goals (2050) with associated targets (2030) and priorities (2018—2026) have been identified:

- **An accessible region with a good quality of life** – by prioritizing and increasing the provision of housing to 22,000 units annually, and by encouraging a more transport-efficient society.
- **An open, gender-equal, equitable and inclusive region** – by prioritizing and leveraging skills on the job market, improve public health, and to encourage children and youth to continue their studies.
- **A leading growth and knowledge region** – by prioritizing strategic research and innovation environments and trade.
- **A resource-efficient, resilient region with no greenhouse gas emissions** – by prioritizing the development of attractive, climate-efficient and resource-efficient regional cores, and by increasing electric-powered passenger and freight transports.

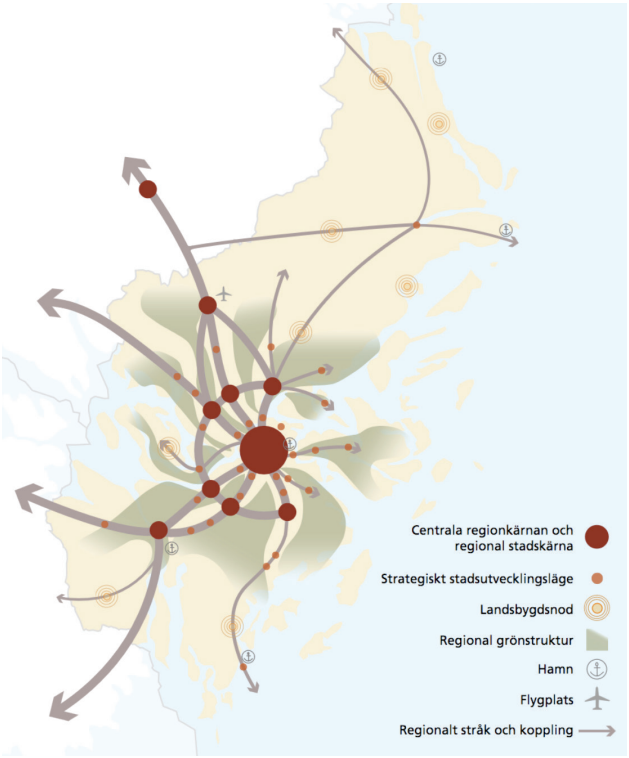


IMAGE regionstockholm.se

EXAMPLES OF TARGETS:

The emission of greenhouse gases should be less than 1,5 tonnes per capita energy production.

Implementation of the Regional Plan adopts six spatial principles to support a balanced development, the provision of infrastructure, strengthened connectivity and access to housing and labour markets. Consideration is also made to adjacent regions and their development.

- Urban development in the best public transport nodes
- Interconnected regional cores
- Resources-efficient systems for inhabitants and goods
- A cohesive green structure and robust aquatic environment
- Stronger links between urban and rural areas
- Accessible settings for innovation, business and decision-makers

2. »The Walkable City« (Promenadstaden)

COUNTRY	**Sweden**
CITY	**Stockholm**
URBAN SCALE	**Comprehensive urban level**
KEY ISSUES	**Comprehensive planning, strategic urban development**

For more information, see **www.stockholm.se/oversiktsplan**

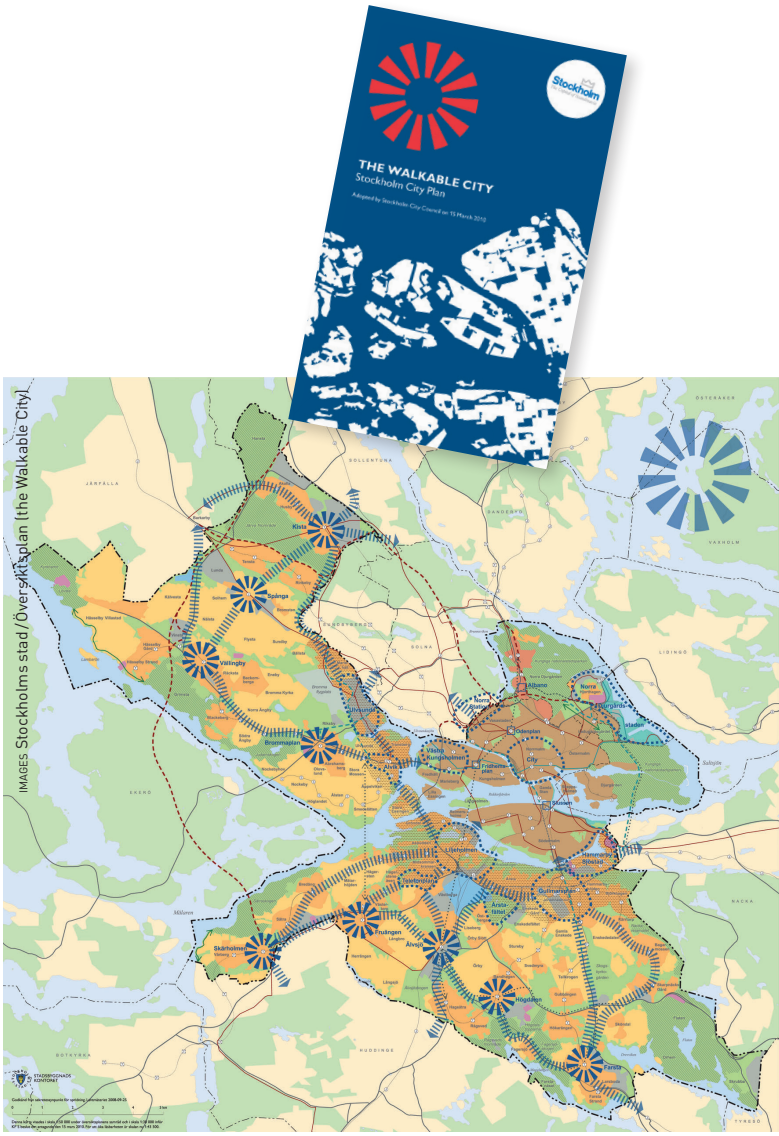
IN 2011, THE CITY OF STOCKHOLM adopted a new Comprehensive Urban Plan – The Walkable City, as a platform for future development of the city, in line with the regional development plan and the city's Vision 2030. Stockholm, as the capital of Sweden, is the economic, political and administrative centre of the region and the country, and thus attracts both new residents and new businesses.

Challenges to this expanding region include supporting a polycentric metropolitan region, adapting the city to a higher population density, using resources more efficiently, addressing environment and climate issues and addressing the socio-economic disparities, e.g. improving life conditions in marginalised areas. Densifying and developing the city on already developed land and using existing infrastructure has been a strategy for the last decade.

To meet the challenges and to promote a vibrant and attractive city, four key strategies are outlined in The Walkable City.

- Maintain and develop the city's competitiveness by densifying and diversifying central Stockholm in strategic development areas, adding new to already existing housing areas to promote social cohesion in the city.
- Develop strategic nodes in the metropolitan area to support the poly-centric urban fabric and provide inhabitants with a robust range of services, cultural opportunities and jobs.
- Improve connectivity and mobility in the city and region by improving infrastructure, including different modes of public transport, and bicycle and pedestrian routes.
- Develop a secure and dynamic urban environment by increasing the density of the city while creating high quality public space and adequate space for public services, etc.

A new comprehensive urban development plan for the City of Stockholm has been adopted to reflect the city's overarching Vision 2040. The current plan builds upon four interlinked goals: a growing city, a cohesive city, good public spaces, and a climate-smart and resilient city. The Walkable City is however still relevant as an example of comprehensive planning for strategic urban development.



IMAGES Stockholms stad / Översiktsplan (the Walkable City)

3. Climate Strategies – Retreat, Defend, Attack

COUNTRY	**Sweden**
CITY	**Mistra Urban Futures / Gothenburg Municipality**
URBAN SCALE	**Comprehensive level / area level**
KEY ISSUES	**Urban planning, climate strategies**

For more information, see
https://goteborg.se/
https://www.mistraurbanfutures.org/en

AS AN EXERCISE TO EXPLORE the consequences of climate change, Mistra Urban Futures (a centre for sustainable development) conducted a transdisciplinary study resulting in possible development strategies for the City of Gothenburg. The study was based on three strategies to adapt to climate change, designed by the British Building Futures and ICE (Institution of Civil Engineers).

Many coastal towns and cities are exposed to raising sea levels and flooding as a consequence of climate change. Depending on geographical location, cities may also experience rising temperatures and dryer summers, and more and heavier rain in winter, which may pose additional threats to the built and natural environment.

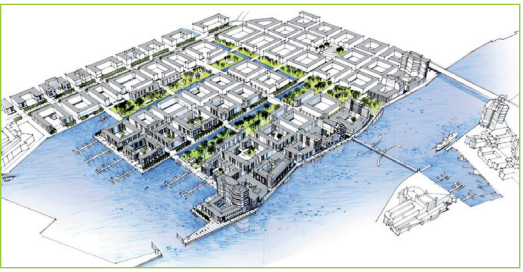
The three strategies, Retreat, Defend and Attack, propose a planned withdrawal of settlements from exposed coastal zones (retreat), the construction of flood protection walls or dykes (defend), and using water bodies for development (attack). The three strategies are summarised below.

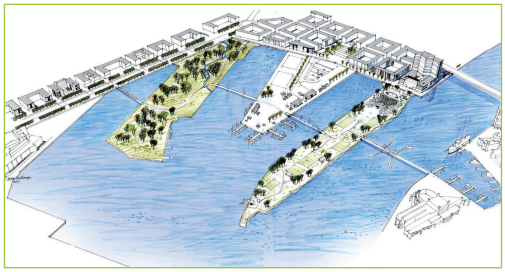
The Retreat Scenario implies that the existing built environment is moved from the area in focus, including buildings, infrastructure and other types of urban functions. With this approach, the risk of exposing the built environment to flooding is minimised, while at the same time increasing the safety of the inhabitants. If the »abandoned« areas are converted into wetlands, parks, etc, opportunities may be created to manage temporary water in the city, as well as supporting the ecological diversity in the area. This strategy entails the costs of removal, as well as less interest in new investments in the area. On the upside, there is no need to invest in expensive protection walls.

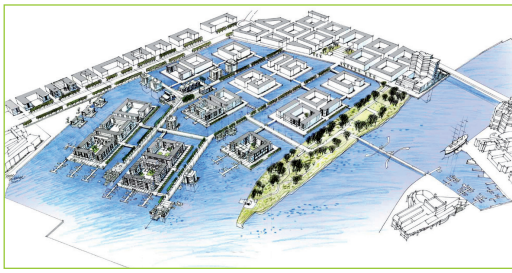
The Defend Scenario proposes flood protection walls to prevent water from flooding into the city. If properly designed, these walls can be integrated into the natural and urban landscape, and provide useful public spaces, e.g. as walkways along the coastline. Such walls can be either permanent or temporary, depending on construction methods and levels of investment. This approach protects vulnerable land and building stock, and minimises the costs of post-flood rehabilitation. Potential negative impacts may be changes and possibly damage to the natural coastal zone, and less access for inhabitants to the seaside. The Attack Scenario uses the water body for development, and allows possible flooding and raising water levels to take place, as buildings and infrastructure are designed to accommodate and adapt to such changes. One possibility is to build on pillars, and design flood-proof entrances and ground floors of buildings. Floating constructions are another option. The strategy may lead to innovative solutions and technological development which have wider benefits.

However, it may provide resilient new settlements, but at significant cost, while other parts of a city or town may remain unprotected.

IMAGES Mistra Urban Futures/SWECO







4. The Western Harbour, Malmö (Västra hamnen)

COUNTRY	**Sweden**
CITY	**Malmö**
URBAN SCALE	**Urban district level**
KEY ISSUES	**Redevelopment, integrated urban development**

For more information, see
www.malmo.se

DEVELOPMENT OF THE WESTERN HARBOUR was launched in 2001 for the Bo 01 European Housing Exhibition. As a pilot for the larger redevelopment area, the first phase demonstrated innovative environmental solutions, inspiring architecture and new approaches to urban spaces, while setting the standard for the following phases.

The vision for the redevelopment is to become a national and international example of a sustainable, integrated and mixed-use urban district, and when completed in 2031, transformation of the former industrial and harbour area will accommodate 25,000 new housing units, services, workplaces, academic and knowledge-based facilities. The district is a leading example of a densely built environment and Malmö's strive towards economic, social and environmental sustainability.

With high sustainability standards and innovative climate and environmental solutions, the area aims for 100% locally produced renewable energy based on wind power, solar energy and heat pumps which extract heat from the sea and an aquifer. These energy production units are linked to the district heating and cooling system of the city. Depending on the time of year, energy is delivered from or to the larger system – resulting in a 1:1 renewable energy production to consumption ratio on an annual basis. Integrated system solutions for waste minimisation, recycling and reuse, reduce the ecological footprint, and energy from waste and wastewater sludge generates biogas that is used as fuel for buses.

Green-blue solutions have been integrated in the built environment to strengthen the biological diversity while creating an attractive public space. Green roofs absorb rainwater which reduces the risk of flooding. Despite its relative density, the area has been provided with a rich and diversified greenery in parks, court yards, streets and squares.

PHOTOS Malmö Stad

Mobility options that reduce car-dependency are integrated and the area aims for 75% of the residents to use public transport, bicycles or walk by 2031. Car-pools have also been introduced as an alternative for privately owned vehicles.

Learnings and best practices from the Western Harbour have been transferred to other districts in Malmö, and many of the solutions, including climate contracts, have been developed in close collaboration between the city, developers, the business sector and academia.

5. Stockholm Royal Seaport (Norra Djurgårdsstaden)

COUNTRY	**Sweden**
CITY	**Stockholm**
URBAN SCALE	**Urban district level**
KEY ISSUES	**Integrated urban development, redevelopment, environmentally sustainable city district**

For more information, see **http://www.norradjurgardsstaden2030.se/en**

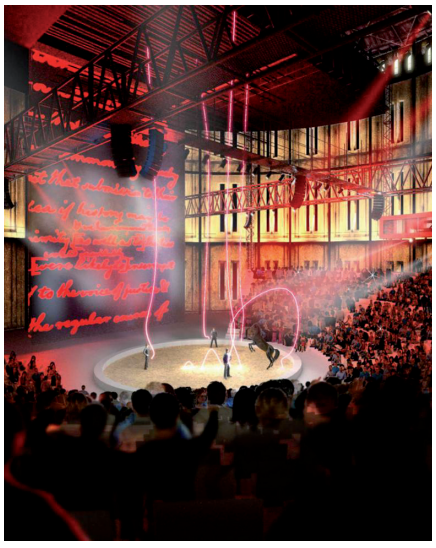
THE STOCKHOLM ROYAL SEAPORT is the largest city district currently under development in central Stockholm and when completed, it will accommodate some 12,000 new housing units and 35,000 new workplaces in a mixed-use built environment. Transformation of the former industrial and harbour areas builds upon using existing environment, infrastructure and buildings to create a new local identity that makes historical values and cultural assets accessible and visible. Parts of the harbour will remain as an active feature in the new district. With high environmental and sustainability ambitions, the initiative has adopted five strategic goals (in summary):

- **A vibrant city** that focuses on people and the establishment of an attractive and vibrant urban environment
- **Accessibility and proximity** to support a dense and accessible urban environment
- **Resource efficiency and reduced climate impact** is supported by flexible and robust solutions to meet future challenges
- **Let nature do the work** allows for ecosystems to create rich environment for flora and fauna, contributing to people's health and wellbeing
- **Participation and learning** is stimulated to create interest and ties to the area and to disseminate knowledge and experiences.

The redevelopment targets to be the next generation of climate-positive urban districts, and will be free from fossil fuels by 2030 and effectively use available resources for a low environmental and climate impact. Closed systems for energy, water and material are integrated in the built environment, and all buildings are planned with high quality standards and toxic free materials.

Following the sustainability goals for the area, detailed plans and quality programmes are prepared for each phase, outlining targets and requirements for both the city and the developers. Monitoring and review of set goals and targets is made on an annual basis, for each phase and for the area as a whole. The goals and targets for the area are linked to the City's overarching environmental and climate goals as well as to Agenda 2030.

PHOTOS Stockholms stad



6. Urban Sustainability Review, Skopje, Macedonia

COUNTRY	**Republic of North Macedonia**
CITY	**The City of Skopje**
URBAN SCALE	**City level**
KEY ISSUES	**Urban sustainability review, transportation strategies**

For more information, see
https://skopje.gov.mk/en_us/

A SUSTAINABILITY REVIEW was conducted in Skopje in two phases. The first analysed the overall urban environment and identified key issues and areas/sectors for improvement. The second phase focused on the urban traffic and transportation system.

The objectives were to illustrate the relationship between transportation, land development, environment, social cohesion and economic progress, and to develop a plan to progressively improve the traffic and transportation situation. The first phase concluded that there was a lack of control over the growing use of private cars, and an almost anarchic parking situation. The public transport system was also in severe decline, due to a lack of financial resources. Alternative scenarios were developed for a 30-year time horizon. The scenarios were fundamentally different, and would have different environmental impacts.

The *ad hoc scenario* involved limited resources, inconsistent policies, uncoordinated institutions, deteriorating mobility for car owners, and unacceptable public transport standards.

The *car scenario* involved a high-class road network, high traffic volumes, a neglected public transport system, urban sprawl and low standards for vulnerable groups.

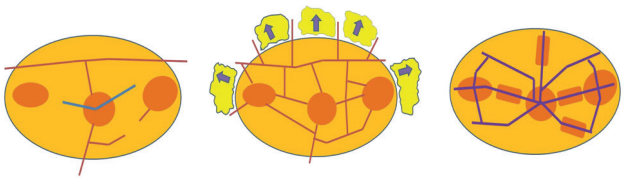
The *public transport* scenario involved a consistent mass transit network supplemented by an attractive feeder system, including bicycle and pedestrian networks, increased densification and less private car use.

The following strategies were developed, based on the public transport scenario: 1. Transform the existing bus system. 2. Develop a segregated, high-class mass transit system, preferably based on Bus Rapid Transport (BRT). 3. Improve the road network. 4. Implement a parking policy.

The sustainability review was undertaken following Sida's manual on Support to Environmentally Sustainable Urban Development.

PHOTO u-PLAN Tor Eriksson

photos https://skopje.gov.mk/en_us/ https://



The »Ad hoc« scenario

The »Urban Sprawl« scenario

The »Public Transport City« scenario

7. The Sustainable Community Concept, Nelson Mandela Bay Municipality, South Africa

COUNTRY	**South Africa**
CITY	**Port Elizabeth / Nelson Mandela Bay Municipality**
URBAN SCALE	**Community level**
KEY ISSUES	**Integrated development, community participation, mixed land use**

For more information, see **https://www.nelsonmandelabay.gov.za/**

NELSON MANDELA BAY MUNICIPALITY has developed the concept for Sustainable Community Unit (SCU) to fill the gap on an intermediate planning level between citywide integrated development planning and detailed neighbourhood layouts, e.g. housing areas. The SCU approach is instrumental in guiding municipal budgeting and resource allocation to reduce inequality and promote integration and urban sustainability at community level.

The SCU identifies six functional areas with direct and indirect linkages to spatial planning: Housing, Work, Services, Transport, Community, Character and Identity. The SCU promotes a wide range of socio-economic neighbourhoods, housing types and tenure options to promote diversity and flexibility over time. To stimulate economic development, employment and income generating opportunities, it promotes business activities in and near residential units and areas, the development of economic centres and commercial corridors, and access to public transport.

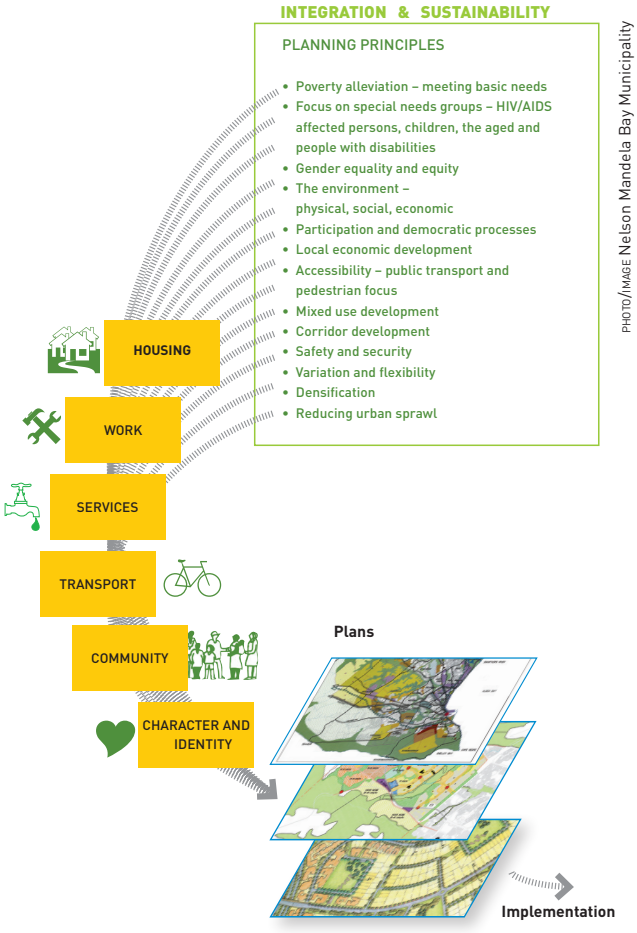
The concept promotes social, commercial, recreational and municipal services in community areas within convenient and safe walking distance, and based on standards that are adequate, sustainable and affordable. Mixed and diversified communities with access to local services and work reduce the need for urban transportation.

Safe pedestrian and cycle routes, and improved access to public transport promote walking and cycling. Community ownership and responsibility are promoted by involving local communities. This strengthens a sense of community and the character of an area, giving a sense of place, pride and identity. This requires community participation in planning, decision-making and implementation of interventions.

The Sustainable Community Concept contributes to poverty alleviation and improved living conditions, including for special needs groups such as those affected by HIV/AIDS, children, the aged and disabled. Equity and gender mainstreaming constitute core values in the participatory and democratic processes. Mixed-use development, corridor development, densification, local economic development, safety and security, and variation and flexibility create an improved environment and reduce urban sprawl.

PHOTO/IMAGE Nelson Mandela Bay Municipality

The Sustainable Community Concept won the World Leadership Award, and thus both national and international recognition.



8. Bus Rapid Transport Systems in Curitiba and Bogota

COUNTRY	**Brazil and Colombia**
CITY	**Curitiba and Bogota**
URBAN SCALE	**City/metropolitan scale**
KEY ISSUES	**Integrated transportation planning, bus rapid transit**

For more information, see
https://www.curitiba.pr.gov.br/
https://bogota.gov.co/

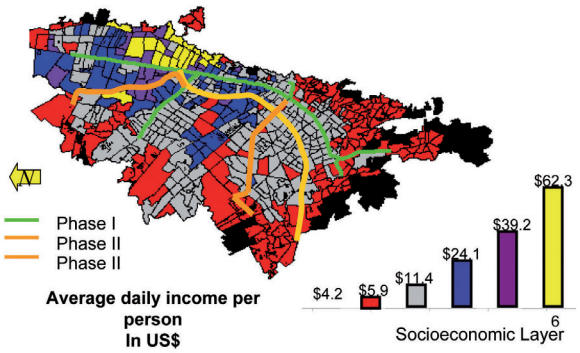
SUCCESSFUL BRT SYSTEMS (Bus Rapid Transit) have been developed in Curitiba, Brazil and Bogota, Colombia, as part of an integrated land use and transportation approach. Following these examples, BRT systems have been introduced in almost 200 cities globally (www.brtdata.org).

In *Curitiba*, an integrated land-use and transportation plan was adopted in 1968, for future expansion of the city along a linear axis with public transport routes in the centre. The fully integrated route network has constantly been upgraded with e.g. express and feeder lines as well as incorporation of new technologies, e.g. hybrid and electric buses. The entire system and different buses are colour coded: red for express buses, yellow for suburban feeder buses, and green for inter-district buses linking the concentric suburbs.

The transport system is supported by bus stations and terminals that also serve as community and commercial centres, and revitalisation of areas around the larger terminals provide additional services, which in turn promote more use of public transport. Since these areas are accessible to many people, they become commercially viable and generate revenue, which goes back into the public transport system.

The public transport system with its bi-articulated buses and integrated (electronic) ticketing system, is used by over 1 million passengers daily and covers approximately 46% of the transport need in the city. The public transport system has contributed to the city enjoying lower levels of air pollution, reduced congestion, and a pleasant and attractive urban environment.

The Transmilenio Bus Rapid Transit system in Bogota is a cost-effective transport solution that serves as a model for other cities. The system features dedicated lanes, large doors to permit rapid boarding and disembarking, and bus stops similar to subway stations. According to the World Bank, the BRT connects different parts of the city, and implemented in three phases it covers 114 kilometers, including bike-parking sites, parking spaces, and a gondola lift system. Following the BRT development, average travel time has decreased by 32%, tax revenues and property values along the main line have increased, air quality has improved, and road fatalities have decreased.



PHOTOS/IMAGE SWECO

9. Tangshan Bay Eco-City, China

COUNTRY	**China**
CITY	**Tangshan Bay Eco-City**
URBAN SCALE	**City/Comprehensive level**
KEY ISSUES	**Eco-city, integrated planning, environment**

For more information, see
https://en.tangshan.gov.cn/

THE TANGSHAN BAY ECO-CITY Project is strategically located in the centre of a potentially strong regional development context, embracing Tianjin, Qinhuanghou and Tangshan. The development of southern Tangshan is based on the development of a new international deep-sea harbour, and a large industrial area that will demonstrate 'a closed-loop economy'.

Nine central features are the basis for planning and design of the Eco-City, reflecting a holistic and interdisciplinary approach to sustainable urban development. The Eco-City has a compact and varied mixed-use structure, in which different layers are interwoven to create an inspiring entity. The urban nodes serve as centres for city districts and have distinct profiles such as innovation, trade, science and sports.

The urban functional mix contributes to an innovative atmosphere that has a positive influence on both business and culture. The structure supports the development of sustainable transportation modes, prioritising walking, cycling and public transportation. The green and blue structures are integral parts of the public space.

The climate-neutral energy systems are based on achieving the lowest possible energy demand through construction of energy-efficient buildings and systems. Renewable power is produced locally, mainly by wind turbines and waste incineration, with the option of increasing other renewable energy sources such as solar cells and tidal energy.

The ecocycle model includes proposals for integrated management of energy, waste and water, and the use of upgraded biogas as a vehicle fuel. One advantage is the possibility to use upgraded biogas as a vehicle fuel. Public awareness and information are combined with user-friendly systems. The city has a general structure that allows for rapid or slow implementation, and also variation in the division and design of blocks and buildings. The integrated urban environment aims to support quality of life, liveability, social security, inclusion and health.

IMAGE SWECO

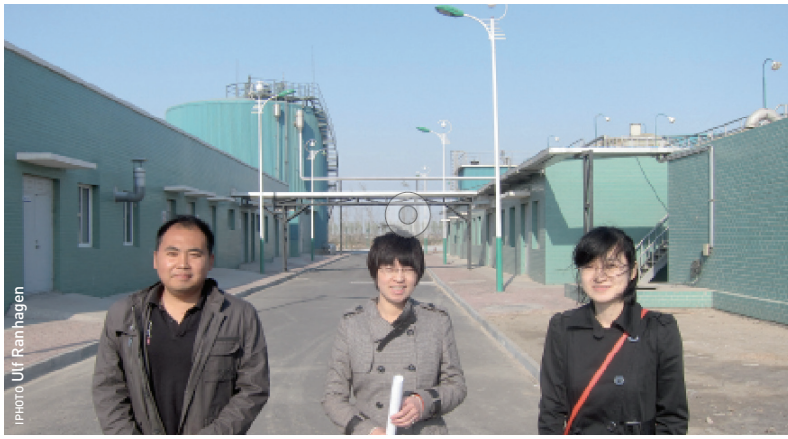


PHOTO Ulf Ranhagen

PHOTO Ulf Ranhagen

10. Climate Neutral Cities, Sweden

COUNTRY	**Sweden**
CITY	**Multiple**
URBAN SCALE	**City/comprehensive level**
KEY ISSUES	**Climate neutrality, strategic planning, climate contracts**

For more information, see
https://viablecities.se/en/

VIABLE CITIES IS A SWEDISH NETWORK ORGANISATION founded in 2017 with a mission to achieve climate neutral cities by 2030. It gathers 48 Swedish cities, six government agencies and a number of research institutions. The program office is staffed by KTH – Royal Institute of Technology, Lund University, RISE – Research institute of Sweden, and SEI – Stockholm Environment Institute. Since 2022, there is an equivalent at EU level with 112 cities working towards the same mission.

Viable Cities takes a holistic approach to sustainable urban development meaning that everyone in society must be involved in order to make the necessary changes: entrepreneurs and researchers, politicians and civil servants, organizations and ordinary people. It is particularly important digitization and digital tools contribute to the major change in various ways.

Viable Cities focus on Swedish municipalities because they are in a great position to involve local actors and make decisions within their geographical area. In addition to the municipality, larger companies are also important for the local transition journey, such as SSAB in Borlänge, the petroleum industry in Gothenburg, or Volvo in Mariestad.

IMAGES viablecities.se

Examples of commitments made by Mariestad municipality in their 2024 Climate Contract are: Sustainable transports for commuters; zero emissions from heavy construction vehicles; a plan for pedestrian and bicycle networks in the municipality; enhanced energy efficiency in public buildings through better insulation, green energy solutions, and low energy lighting solutions.

The Climate City Contract 2030 tool is the hub of this joint effort of Viable Cities. Each city collects its climate and sustainability commitments in the contract, which is revised and signed every year. The Climate Contract is a binding long-term political commitment signed by the highest political level in the municipality. It includes concrete goals, indicators and targets, and describes investment priorities needed to advance climate neutrality faster.

The six authorities and Viable Cities describe in the contract how they will support the cities' local transition journeys. The 48 cities in the climate contract initiative have countless efforts underway to contribute to all of this. They are working to reduce greenhouse gas emissions, to save energy, to build better, to create sustainable mobility for all, to engage more people, to govern and lead in new ways. And they are all sharing their experiences to work together to create a new normal of climate-neutrality. It is believed that when cities join forces – whether in terms of monitoring, governance, procurement or mobility – the opportunities to accelerate the transition increase. Scaling up and sharing knowledge sends clearer signals to the market, and gives decision-makers more confidence and legitimacy to take bold steps.

In 2022, the concept of Climate City Contract was introduced to the Turkish city of Mersin by the SALAR International project Resilience in Local Governance, as part of a process inspired by the SymbioCity Approach. Mersin is a big port city in the south-east of Türkiye which has established a Green Transition Centre to support city stakeholders to reduce carbon emissions and work for green transition in various ways, including offering trainings to local businesses on the European Green Deal.

»Think Green for the World«, Mersin NGO meeting Mersin international port (https://www.e-greenworld.org/mersin-meeting/)

11. Integrated Urban Development in Makuru Settlement, Nairobi, Kenya

COUNTRY	**Kenya**
CITY	**Nairobi**
URBAN SCALE	**Urban area / community**
KEY ISSUES	**Integrated planning, slum upgrading, community engagement**

For more information, see **https://www.muungano.net/mukuru-spa**

MAKURU INFORMAL SETTLEMENT, located in the industrial area south of Nairobi Central Business District (CBD), is one of the largest in Nairobi and the home of approximately 100,000 households suffering from insecure tenure, inadequate housing and access to basic services.

Initiated in 2017, the community-driven Mukuru Special Planning Area (SPA) aimed to improve the living conditions through an inclusive and transformative approach, inviting not only residents and local government, but also some 40 organisations from civil society, academic institutions and private sector.

The initiative has set a precedent for participatory upgrading, indicating a significant shift in recognizing that conventional planning lacks the capacity to address the multifaceted issues in slums, necessitating active community involvement.

To drive this initiative, an 'integrated development plan' was prepared in alignment with community needs, generating specific sector plans finalized with Nairobi City County. The involvement of Mukuru's residents has been paramount throughout the planning phase, and all members of the community had the right to participate in consultations, which were organized under the SPA framework, allowing residents to voice their concerns and collaborate with local representatives.

The planning process was organized into eight consortia led by various departments of Nairobi City County, with each group contributing by gathering and analyzing situational data. Their efforts were directed towards ensuring that community insights were combined with financial, legal, and spatial realities to create a comprehensive plan in response to the challenges.

Mukuru's current situation is deeply rooted in historical factors that have shaped the settlement and influenced state responses to its challenges. The initiative was founded upon years of community engagement, research, and collaborative initiatives involving various stakeholders, and serves as an example of new models of community organisation.

The vision for Mukuru represents a broader aspiration of creating inclusive cities, in this case with support from Muungano wa Wanavijiji (the Kenyan federation of slum dwellers), Akiba Mashinani Trust (fund), and Slum Dwellers International Kenya (SDI).

The 8 planning consortia

IMAGE muungano.net/mukuru-spa

12. Umeå, Sweden – Gender Responsive Urban Development

COUNTRY	**Sweden**
CITY	**Umeå**
URBAN SCALE	**City/municipal**
KEY ISSUES	**Inclusive development, gender responsive planning and design, governance**

For more information, see
https://www.umea.se/

THE SWEDISH CITY OF UMEÅ has taken a number of deliberate steps to advance gender equality, serving as an example for creating inclusive urban environments where men and women have equal possibilities to influence societal structures and their individual lives. Originally introduced in 1978, the current form of the Gender Equality Committee in the City Council was established in 1994 and is responsible for assessing and integrating gender equality measures into the municipal administration.

The municipality has adopted a »gendered landscape« approach, which advocates for a nuanced understanding of gender power dynamics, e.g. through gender-segregated data and analysis, but also through dialogues that inform public service delivery and urban planning. Initiatives like the gendered landscape bus tours, is one way to identify and address gender inequalities in urban planning and design. Umeå's efforts include the improvement of public spaces and the perception of security among its residents, especially women and girls, who often modify their travel routes due to safety concerns. Increasing the number of people in public spaces is one strategy to enhance safety.

One of the signature initiatives to enhance gender responsive urban planning and design, is the establishment of the »Free Zone«, a welcoming social space designed to be accessible and inclusive for all. The layout and design reflect the needs of the community, especially young women, including seating arrangements and visibility. The space encourages social interaction and cultural expressions, with installations and decorations by local youth.

Umeå has won national and international recognition and serves as an example of sustainable urban development that recognises and prioritises the importance of gender equality in urban development, in particular in the provision of public space that takes local needs into account.

Aspects of the gendered landspace

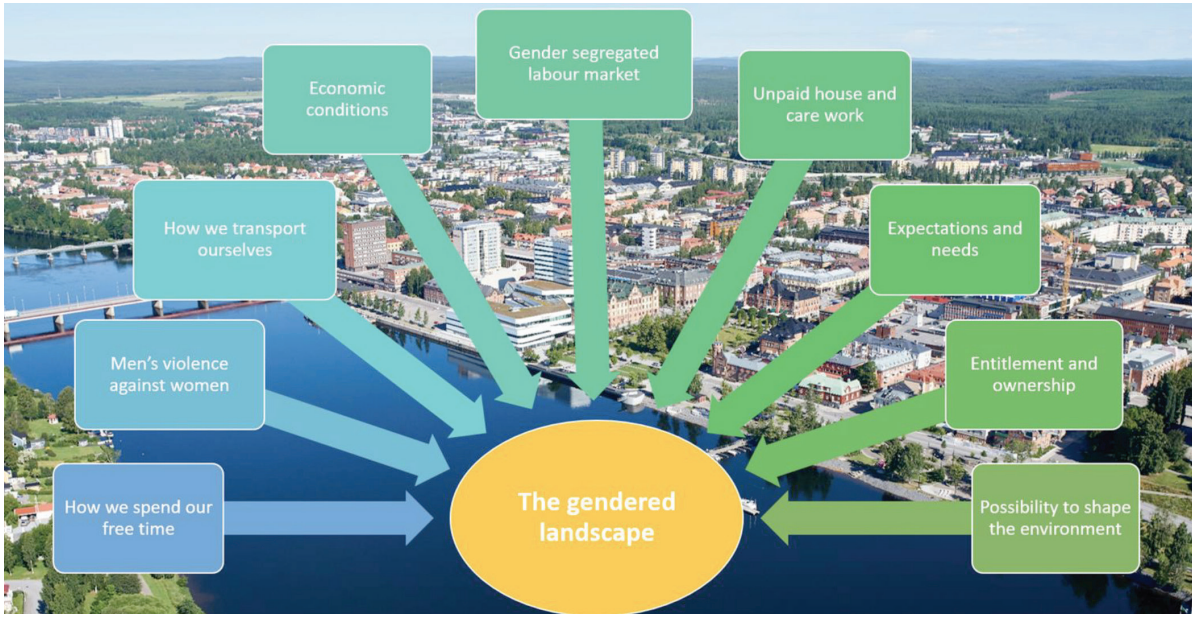


IMAGE umea.se

13. Malmö in the making

COUNTRY	**Sweden**
CITY	**Malmö**
URBAN SCALE	**City-wide / municipal**
KEY ISSUES	**Public awareness, public space, community engagement**

For more information, see **https://malmo.se/Malmo-in-the-making.html**

MALMÖ IN THE MAKING is an initiative launched by the city of Malmö alongside the designation of Copenhagen as the UNESCO World Capital of Architecture in 2023.

Malmö in the making aims to explore the role and enhance the significance of the city's urban space, architecture, and culture in shaping urban development. At the time, the initiative was built upon three main components: public discussions on future living environments, engagement of the residents, and an interdisciplinary call for proposals focused on local neighbourhoods.

As an initiative aiming to spur advocacy, engagement and raise awareness, it featured a diverse range of events and activities implemented across the city, developed in collaboration with local stakeholders from architecture, academia, business, and cultural sectors. The contribution from various actors to the public programme also demonstrated an interest and commitment to community involvement and dialogue.

The Power of Places, an integral part of Malmö in the making, was shaped as an open call and featured a collaborative effort between the City of Malmö and the Swedish Architecture and Design Centre (ArkDes), with support of the Society for the Preservation of Cultural Heritage and Green Parks in Malmö. It focused on the further development of the neighbourhoods of Rosengård and Nyhamnen, each with unique geographical characteristics and developmental needs and where the City of Malmö actively was involved in urban planning and development processes.

From the open call, two interdisciplinary teams were selected to make an inventory of the two areas, explore new ways of working and identify innovative solutions and practices for future urban development. For example, the team working on Nyhamnen explored possibilities for re-activation of the area and the creation of new social meeting places by taking local greenery, material and the urban fabric into account.

Malmö in the making demonstrates opportunities to foster community dialogue on urban spaces and architecture, emphasizing inclusive and participatory development and the cultural meanings of urban landscapes.

»Malmö in the making« – activities

PHOTOS malmo.se/Malmo-in-the-making.html

PHOTO Klas Groth

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In a rapidly urbanising world, a holistic approach to urban development is more critical than ever to meet the 2030 development agenda. Sustainable urbanisation requires a systemic transition towards a green and circular urban future, accelerated climate action, and an effective and efficient use of available economic, natural and other resources. Holistic and visionary urban development, nourished by inclusion, synergies, innovation and transformative solutions, provides the basis for current and future generations to enjoy a prosperous and inclusive urban future. Addressing spatial inequalities and the way our cities and towns are organised is key in ensuring urban environs where human well-being, rights and needs are met.

The SymbioCity Approach promotes a paradigm shift towards sustainable urbanisation, where national to locally-led urban development initiatives build upon human-centric and value-driven processes for all to enjoy the benefits of social, economic and environmental development.

The SymbioCity Approach is a Swedish Government initiative promoting sustainable urbanisation worldwide, informed by Swedish knowledge and innovation, and with a significant local governance perspective. Since 2012, the Swedish Association of Local Authorities and Regions (SALAR), through SALAR International, has functioned as the secretariat for the SymbioCity Approach and its global application.

The SymbioCity Approach 2026 is the 2nd edition of the methodology originally published in 2012. We hope this publication inspires and strengthens your work toward vibrant, resilient urban communities.

Swedish Association of Local Authorities and Regions

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