

Operationalizing the Urban NEXUS: towards resource-efficient and integrated cities and metropolitan regions

Executive Summary

Cities are where we must address both local and global resource constraints

Policy makers at all levels and practitioners from across the public, private, philanthropic and civil society sectors recognize that human civilization is facing increasingly urgent resource constraints. These will require a dramatic optimization of the way we use resources. Isolated “business as usual” solutions aimed at just one sector miss out on efficiently resolving these resource challenges of the 21st century – a century marked by an increasing demand for urban space and higher quality of life amidst rising costs of lifestyles and urban production, increasing risk and vulnerability, and declining investment and fiscal support for urban development.

Today, more than half of the world’s population lives in urban areas, with seven out of ten of the 9.6 billion people on the planet projected to live in cities by 2050 (WHO, 2013). In addition to demographic growth, cities and metropolitan regions are dynamic centers of economic activity and vast resource flows. As such, cities and metropolitan regions comprise the world’s most complex “nexus” of social, political, economic and ecological systems.

The extent of rapid urbanization trends is translating into a growing and urgent demand for new or improved infrastructures, services and institutions capable of meeting the three-fold challenge of: 1) providing larger urban populations with access to basic services and vital resources, 2) sustaining continuous economic development, and 3) managing resources within our planetary limitations while addressing the challenges of climate change adaptation and mitigation.

Attempts to satisfy the resource demands of growing urban areas and lifestyles has meant looking ever further afield for supplies – from metropolitan and rural hinterlands, and increasingly at the regional and global level. Meanwhile, prevailing urban governance and management practices in which resources are managed in isolation by their respective sectoral departments (e.g. water, energy, agriculture), have resulted in wasteful trade-offs and increasing fragmentation of infrastructure, land-use and governance mechanisms at the city and metropolitan level. To sustainably govern these rural-urban linkages and resource inter-dependencies, it is now more recognized than ever that the way forward must be an integrated approach to development and resource management, both across sectors and across scales.

A growing number of cities from across the globe, such as Curitiba, Brazil, to Durban, South Africa, have boldly put this notion to practice by turning away from dis-integrated “silo” planning, to dramatically optimize synergies between sectors and manage trade-offs through innovative integrated and cost-effective planning, as well as collaborative decision-making and implementation.

The study “Operationalizing the Urban NEXUS” is founded on these pioneering experiences from cities all over the world that have recognized the crucial inter-linkages between sectors such as water, energy and food – now commonly

BMZ



Bundesministerium für
wirtschaftliche Zusammenarbeit
und Entwicklung

Published by

giz

Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

ICLEI
Local
Governments
for Sustainability

understood as the “Water-Energy-Food security NEXUS” . Going beyond the Water-Energy-Food NEXUS, the examples in this study integrate a variety of strategic urban resource sectors and services ranging from combining sustainable urban transportation with inclusive housing and employment schemes, to coupling waste management with energy production, and sanitation solutions with social inclusion and biodiversity conservation.

Such innovative solutions have broken the barriers between sectors and stakeholders, and between institutions and levels of government involved in their conception and implementation.

Given the wealth of global examples to learn from, this study developed a transferrable and action-oriented methodology to operationalize such practices of organizational and resource optimization in urban and metropolitan regions. The study defines the “Urban NEXUS Approach” and a project development cycle (the Urban NEXUS Development Cycle) founded on successful real-world experiences, and it offers city makers a “how-to” framework for implementing integrated Urban NEXUS solutions.

Introducing the Urban NEXUS: a way to break “silos” and collaboratively optimize urban resources

The Urban NEXUS seeks out opportunities for integration in cities and

What is the Urban NEXUS?

The Urban NEXUS is an approach to the design of sustainable urban development solutions. The approach guides stakeholders to identify and pursue possible synergies between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality.

It counters traditional sectoral thinking, trade-offs, and divided responsibilities that often result in poorly coordinated investments, increased costs, and underutilized infrastructures and facilities. The ultimate goal of the Urban NEXUS approach is to accelerate access to services, and to increase service quality and the quality of life within our planetary boundaries.

GIZ and ICLEI, 2014

An **Urban NEXUS solution** integrates two or more systems, services, policy or operational “silos”, jurisdictions or social behaviors.

metropolitan regions at the different scales of the built environment and its infrastructures; integration of the region’s supply chains and resource cycles; and of the policies and operations of local, regional, sub-national and national jurisdictions. For that purpose, an Urban NEXUS solution integrates two or more systems, services, policy or operational “silos”, jurisdictions or social behaviors, in order to achieve multiple urban policy objectives and to deliver greater benefits with equal or less resources. Urban NEXUS solutions typically involve a set of coordinated measures that range the areas of technology, policy, planning, finance, business models, institutional design, and communications - amounting to a “solution set”.

Although the process for identifying a prospect and designing a solution may be transferable, Urban NEXUS solutions developed for one place may not be transferable to another. Therefore, the Urban NEXUS approach is fundamentally a process of solution customization, and depends on the valuable input from all relevant stakeholders.

As an **institutional agenda**, the Urban NEXUS approach urges governments at all levels and international development organizations to institute fundamental reforms in policies, institutional arrangements, as well as project development and finance guidelines in order to significantly reduce isolated, uncoordinated and ultimately inefficient urban development approaches. Anchoring the Urban NEXUS in institutions and institutional processes and thus ensuring long-term systemic reforms, strengthens integrated urban development in spite of intermittent, possibly conflicting political interests or political change.

Implementing the Urban NEXUS Approach

The Urban NEXUS Development Cycle

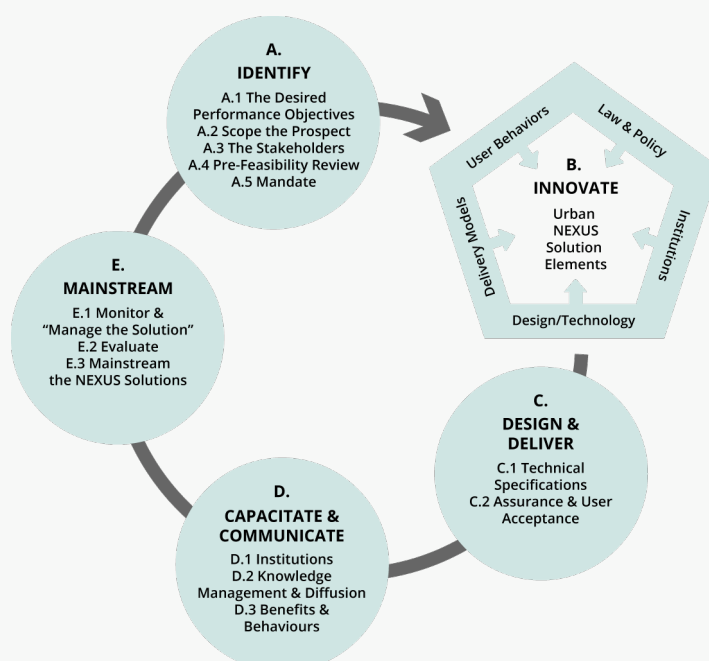
Building upon established concepts and practices of integrated planning, the Urban NEXUS Development Cycle provides a strategic design process for translating integrated policy and planning objectives into feasible projects, technical solutions, and operations.

Examples given in this study show that the cities with the most successful practices in terms of development innovation have been the first to establish design processes, capacities and institutions to complement their planning schemes; thus designing more integrated solutions in collaboration with the public and private sector. To offer other city makers a framework for such a development innovation process, the following briefly outlines each stage of the Urban NEXUS Development Cycle (*Figure 1*).

Key strategy question:

What process will be used to accelerate the preparation, testing, monitoring & evaluation, and scaling of an Urban NEXUS solution?

Figure 1:
The Urban NEXUS Development Cycle is a process for translating integrated planning objectives into policies, projects, systems, and places.



GIZ and ICLEI, 2014, Operationalizing the Urban NEXUS

© ICLEI, GIZ and TNP

Key strategy questions:

What are the targeted increases in organizational and resource productivity? How will we measure Urban NEXUS success?

And what are the prospects for productivity enhancing synergies and benefits that can be gained by integrating two or more of your operations or systems?

Key strategy question:

What innovations, measures and reforms are required to enable the Urban NEXUS prospect?

Key strategy questions:

Are there already locally established or piloted technical and operational solutions this project can build on and improve?

Which system performance measures will be used to evaluate system-wide outcomes?

Key strategy questions:

What capacities, skills and behaviors will be required to establish a new solution, and ensure that it is maximized?

What will be the best channels for such communication and capacitation?

A. IDENTIFY. The four primary Urban NEXUS Practice Objectives – increased systemic effectiveness, increased demand-driven suitability and customization, increased productive efficiency, and increased resilience and adaptive capacity – are identified and adapted locally. To achieve the strategic objectives, stakeholders then identify the local Urban NEXUS integration prospects. Prospects for building synergies can be found in five Areas of Integration:

- **Integration across Scales** of the built environment, infrastructures, local and regional supply chains and resource cycles, and policies and operations of local, regional, sub-national and national jurisdictions;
- **Integration of Systems** of resource extraction and power generation, food cultivation, processing, manufacture, resource supply and waste management etc. by establishing cascades and cycles of resources between systems;
- **Integration of Services and Facilities** to avoid the underutilization of valuable fixed assets by integrating services and facilities conventionally separated by sectoral functions;
- **Integration across Silos** consolidating institutional interests and managerial and professional “silos” arising from the organization of urban areas and systems into separate jurisdictions, utilities, and departments; and finally
- **Integration of Social Relations and Behaviors** to enable all stakeholders’ engagement in the above integration dimensions, and counter legacies of cultural, social, and political division.

B. INNOVATE. The identified stakeholders collaborate in a structured innovation process to develop a set of politically, institutionally, and economically viable measures in the Areas of Urban NEXUS Innovation spanning the range of law and policy, design and technology, delivery models and financing, communications and changing user behaviors, and institutional design and development.

C. DESIGN and DELIVER. The design and delivery of the solution includes prototyping and piloting it in a real-world operating environment. This study included the implementation of two such pilot projects in Nashik, India and in Dar es Salaam, Tanzania. These cities took first steps in implementing an Urban NEXUS approach in an exemplary way. In the limited duration of the pilot projects, the Urban NEXUS brought together a wide range of stakeholders who had never before been sitting together at one table, thus generating new “institutional nexus”. They collaboratively designed and implemented innovative solutions and programs for optimizing water, energy and land resources in peri-urban agricultural practices (Nashik), and improving the learning environment at two municipal schools while installing integrated energy efficient technologies, rainwater catchment and vertical food production systems (Dar es Salaam) to demonstrate the benefits of Urban NEXUS thinking to local communities and government officials.

D. COMMUNICATE and CAPACITATE. The three main areas of capacity building typically required to establish a new solution are: training operational staff on managing their parts of the solution; encouraging behavioral change and building required skills of beneficiaries; and enabling the relevant institutions to establish a systematic process for introducing and supporting it in new locations or facilities.

- E. UPSCALE and MAINSTREAM the Urban NEXUS.** Mainstreaming in many cases is a matter of designating or creating an entity that specializes in the scaling of all the unique aspects of the given Urban NEXUS solution; an entity with the capacity to address location-specific problems and to “manage the solution” within different contexts.

Accelerating action and strategic cooperation towards Urban NEXUS solutions

The Urban NEXUS provides a necessary and crucial alternative to continuing with “business as usual” approaches to urban development, services and infrastructure. When decision makers actively counter sectoral thinking and divided responsibilities, they can encourage the collaborative development of the solutions urgently required in cities and metropolitan regions. In doing so, this will not only optimize the use of limited natural, financial, and human resources and institutional performance, it will improve resource productivity and quality of life.

For this purpose, this study inspires innovative actions towards local and regional NEXUS solutions and provides a framework for action with the Urban NEXUS Development Cycle for their collaborative design and implementation. However, to further develop and mainstream the Urban NEXUS, there are tested and demonstrated factors for success for decision makers, civil society actors and international development cooperation agencies to apply:

- Identify “hotspots”. When identifying priorities for Urban NEXUS projects, consider the areas, or “hotspots”, where this approach would have the most multiplier or ripple effects to maximize the reach and benefit of the initiative.
- Bring all stakeholders around the same table by creating “Urban NEXUS Task Forces”. Urban NEXUS Task Forces created to oversee Urban NEXUS projects at the urban and regional level serve the purpose of linking relevant departments and levels of government together with other key stakeholders (experts, civil society, private business, NGOs and multi-lateral organizations). Urban NEXUS Task Forces are a simple way to kick-off, strengthen and sustain cross-departmental collaboration offering stakeholders a taste of “breaking the silos”. Eventually, the goal is to institutionalize such multi-stakeholder collaboration.
- Encourage all governmental authorities and stakeholders at all levels to be part of Urban NEXUS solutions, which should reconnect scales and optimize complex cross-boundary resource flows (e.g. river basin management).
- Promote supportive framework conditions for Urban NEXUS solutions at all levels. Urban NEXUS projects regardless of their size and scope are embedded in regulatory and administrative frameworks. For example, national “silos” in regulation, public procurement, budgeting and accounting processes, etc., can hinder innovative integrated approaches and cross-departmental cooperation at the local level. Supportive national and decentralized frameworks regarding legislative mandates, financial support and incentives are therefore crucial for the up-scaling of successful local and regional Urban NEXUS initiatives.

Key strategy questions:

Which performance outcomes would you like to see replicated and up-scaled?

What were the main challenges to learn from and success factors to mainstream in existing and future initiatives?

What is the role of international development cooperation?

The German Development Cooperation under the lead of the Federal Ministry for Economic Cooperation and Development have played a vital part in the initial development of the Urban NEXUS approach. For the future, the approach is intended to spread out to international and local partners in order to multiply implementation, assessment and learning experiences off the beaten track of mono-sectoral thinking. In doing so, the Urban NEXUS thinking offers a new perspective to the achievement of ambitious global objectives on sustainable urban development, i.e. in the course of debating the New Urban Agenda at the Habitat III conference or the Sustainable Development Goals within the post-2015 Development Agenda.