

INTEGRATED RESOURCE MANAGEMENT IN ASIAN CITIES: THE URBAN NEXUS

MORGENSTADT BENCHMARKING AND CITY DEVELOPMENT CONCEPTS

FULL REPORT



FRAUNHOFER INSTITUTE FOR INDUSTRIAL ENGINEERING IAO

MORGENSTADT BENCHMARKING AND CITY DEVELOPMENT CONCEPTS

The Urban Nexus & Sustainable Urban Governance

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Integrated Resource Management in Asian Cities: the Urban Nexus – Sustainable Urban Governance

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Project number: 130829

Project partner: GIZ project „Integrated Resource Management in Asian Cities: the Urban Nexus“

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Executive Summary

The Fraunhofer Institute for Industrial Engineering (IAO) has been integrated into the Urban Nexus framework by the project »Integrated Resource Management in Asian Cities: the Urban Nexus« in order to deliver a fundamental study on the given governance aspects in the three Urban Nexus partner cities, Ulaanbaatar, Da Nang, and Korat. The study will serve to develop strategic and systemic measures to support innovative and future-oriented city development, as well as to supply all of the Urban Nexus partner cities with an instrument to be used further on for self-evaluation.

Fraunhofer has grounded experience in city systems analysis due to the Morgenstadt Initiative, which was introduced in 2012. It addresses the »City of the Future« by analyzing, for example, how cities which are leading in sustainable development worldwide have reached this position and how their achievements can be transferred to other cities even if located in a different environment and culture. The methodology developed for the Morgenstadt Initiative was adjusted to the Urban Nexus project and focuses mainly on urban governance aspects in the context of the food, water, and energy sectors. Integrated resource management in this context is seen as approach to secure food, water, and energy provision and enable sustainable development.

For each one of the three analyzed cities Ulaanbaatar, Da Nang, and Korat, a city profile was developed. It contains 1) an explanation of the most promising success factors to bring each city further with regard to integrated resource management, 2) a list of impact factors that directly influence urban development in each city, as well as 3) first recommendations on how to improve the urban governance framework for integrated urban development. While we acknowledge that integrated resource management needs to be developed on different levels, the Morgenstadt approach focuses on an urban scale. The city profiles, which were developed based on the Morgenstadt framework, hint towards possible low-cost and easy-to-realize solutions on city basis which might add critical value on the path towards an urban NEXUS. The collection of recommendations made for the cities in the study at hand are potential solutions for their municipal administrations to consider. They serve as initial input for a change in viewing angles and can be discussed, assessed, and discarded or modified, as each administration wishes. The complexity of continuous urban development and urban governance makes integrated and individual strategies to reach predefined goals necessary. These strategies are needed as a platform to coordinate and cluster measures and to enable each municipality to adapt to changes and be resilient towards disruptive events in the long-term.

Besides generally improving awareness about the necessity and benefits of integrated planning for food, water, and energy security, the concept of sustainability, and the value added by good governance, three success factors for sustainable urban governance were identified as common ground for improvement across the analyzed cities:

- Usage of Statistical Data for Informed Municipal Decision-Making.
- Improvement in Specialized Expertise in the Municipal Administration.
- Usage of Cross-Sectoral Communication Models.

These three success factors have been integrated into a project idea named »Sensing Nexus« which will be introduced as an outlook in the final chapter of this report.

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List of Abbreviations and Acronyms

ASEAN	Association of Southeast Asian Nations
BID	Business Development District
BMZ	German Federal Ministry for Economic Cooperation and Development
BRT	Bus Rapid Transit
CSR	Corporate Social Responsibility
DATRAMAC	Da Nang Traffic Light and Public Transportation Management Center
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IAO	Institute for Industrial Engineering
IBP	Institute for Building Physics
ICT	Information and Communications Technologies
IFAD	International Fund for Agricultural Development
IGB	Institute for Interfacial Engineering and Biotechnology
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
m:ci	Morgenstadt: City Insights
MDGs	Millennium Development Goals
NGO	Non-governmental Organization
PPP	Private Public Partnership
R&D	Research & Development
RE	Renewable Energies
SDGs	Sustainable Development Goals
SF	Success Factor
SME	Small- and medium-sized enterprises
SPI	State-Pressure-Impact Indicators
UB	Ulaanbaatar, Capital City of Mongolia
UN	United Nations
UN ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNU	United Nations University
WDESP	Water Drainage and Environmental Sanitation Project
WWTP	Centralized Waste Water Treatment Plant Ulaanbaatar

The report at hand focuses on existing governance aspects in relation to food, water and energy security in the three selected nexus partner cities, Ulaanbaatar, Da Nang and Korat. It produces a city profile for each city, which serves to develop strategic and systemic measures to support innovative and future-oriented city development and/or infrastructure projects as well as to supply the cities with an instrument to be used further on for self-evaluation. This first chapter introduces the report's background, including information on the project objectives and methodology.

1.1 The Urban Nexus Project

The »City Profiling and Benchmarking« executed by the Fraunhofer Institute for Industrial Engineering IAO is carried out in the context of the »Integrated Resource Management in Asian Cities: The Urban Nexus« project, implemented by UN ESCAP and GIZ with funding from BMZ. Developments underlying the Urban Nexus debate and the project itself are inefficiencies in the food-water-energy nexus induced by provision gaps which are likely to increase due to growing populations, improving living standards, and global climate change (die 2013; SWP 2013a; SWP 2013b). According to SWP (2013a), Asia is considered the biggest challenge in terms of sustainable provision of food, water, and energy and interlinked provision risks within the nexus. According to Valieva (2013) poor governance adds to the situation.

The overarching Urban Nexus project goal is to improve capacities (institutional and personal) for integrated urban resource management in selected Asian cities. Therefore, its initial aim is to target »the local level, by providing technical advice to municipal administrations/planning offices through international and national experts and [to facilitate] the establishment of Nexus Task Forces« (GIZ 2013e). As stated by the Stockholm Environment Institute (SEI 2011) »the nexus approach highlights the interdependence of water, energy and food security and the natural resources that underpin that security – water, soil and land. [...] provides an informed and transparent framework for determining trade-offs and synergies that meet demand without compromising sustainability«. Improving governance across sectors and increasing efficiency are two aspects that are detailed further in the Urban Nexus approach. Interactions across the Urban Nexus are water for energy, energy for water, water for food, energy for food, etc. For those »additional benefits that outweigh the transaction costs associated with stronger integration across sectors« (ibid.: 5) are examined. To improve the outcomes on basis of these interdependencies, three guiding

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