

📍 Shanghai, China

IMECOGIP

Implementation of the ecosystem service concept in green infrastructure planning to strengthen the resilience of the Metropole Ruhr and Chinese megacities

»Green infrastructure« contributes to strengthening the resilience of the metropolis Ruhr and Chinese megacities, as it is a carrier of ecosystem services. IMECOGIP develops innovative methods for their assessment, taking into account cultural, socio-economic and climatic characteristics. IMECOGIP develops knowledge and methodological expertise and transfers it into the planning practice of both regions.

Project Objectives

How efficient are and what benefits do the various parts of a city provide for people (green spaces, greened residential and industrial areas, avenues, forests, nature reserves, meadows, agricultural areas, etc.) depending on their composition of natural or near-natural elements? Where is a need for improvements and where are possibilities for optimisation? What are the advantages and disadvantages of planning options? The project develops an innovative package of methods to support the planning of »green infrastructure« in densely populated urban areas. Through close cooperation with developers and potential users from business and administration, IMECOGIP contributes to applied and practice-oriented implementation research in Germany and China.

Challenges

In Germany, strengthening of »green infrastructure« including ecosystem services in urban areas is a political consensus and is promoted by the EU, among others. In China, recent environmental policies of the central government directly address ecosystem services. Nevertheless, the implementation in regional and local planning in both countries faces major challenges. On the one hand, hardly any explicit regulations have been institutionalised so far, and on the other hand, planners and politicians adhere to established paradigms and planning routines. In addition, both countries are faced with the task of adapting the acquired knowledge and methodological skills to practical requirements. This happens in a practice-oriented research approach. The project provides methods, which make »green infrastructure« more noticeable and visible and applies them to specific case studies. Moreover, the need for basic data becomes apparent. There is a clear imbalance between the two countries in the availability of freely available data (e.g. high-resolution geodata).

**Addressed Sustainable
Development Goals
of the United Nations**

3 GOOD HEALTH
AND WELL-BEING



6 CLEAN WATER
AND SANITATION



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



13 CLIMATE
ACTION





Image provided by RUB Harald Zepp

Research Approach and Methods

IMECOGIP combines the expertise of scientists from various disciplines and research fields: Urban Ecology, Ecosystem Services Science, Landscape Architecture, Biogeography, Human Geography and Urban Sociology (Urban Governance), Geomatics. The Common International Classification of Ecosystem Services by Haines-Young & Potschin provides the conceptual framework for the ES-assessment of different plans in our toolbox. The toolbox is designed as an open GIS-based programme package. It is supplemented by ecosystem service profiles as part of a methodological manual, which explains both the scientific principles, the necessary data and framework conditions for their application, as well as programme-related details. In addition, there are illustrative case studies. Pilot areas in the metropolis Ruhr and in Shanghai support the method development. They show the lack

of basic data and gave occasion to extensive data collection (Big Data) in the field with high-resolution satellite data. A science-policy dialogue was established as an interdisciplinary collaboration and exchange format. This format serves as the cooperation basis of the transdisciplinary network between research institutions, planning authorities and companies.

Focus Topics

- Strategic planning of »green infrastructure«
- Nature-based solutions
- Sustainable urban development
- Climate protection and adaptation
- Knowledge transfer into planning practice



»It is increasingly urgent to improve the resilience of metropolitan areas to respond to climate change. Through digital based tools and interdisciplinary innovations, combined with cutting-edge researches and the latest planning practices, IMECOGIP explores how to accurately monitor and analyse complicated problems in green infrastructure planning, find the solution and support landscape performance assessment.«

Nannan Dong



Expected Solutions and Innovations

The IMECOGIP toolbox will allow comprehensive analyses of ecosystem services in urban areas in large parts of Europe and Eastern China. A detailed manual explaining functions, methods, and technical features to interested users in administration, politics and science will ensure the applicability and transferability of the toolbox. Online materials and peer-reviewed journal articles in English guarantee the visibility of the solutions developed for »urban green« assessments. Besides, institutional reforms in Chinese environmental planning underline a broader acceptance with regard to sustainable urban developments. The project therefore focuses on cooperation agreements with public administrations and leading consulting agencies. Moreover, the open-source solution for the developed methodological package is designed to provide a long-lasting added value. This makes it possible for practitioners everywhere to design their own flexible applications in administration and business.



Experten Workshop Zeche Zollverein in Essen.

Image provided by RUB Lars Gruenhagen



»In a few years, ecosystem services and nature-based solutions will become a must-have for resilient and climate-friendly urban planning. Our project provides groundbreaking, supportive methods and know-how for this purpose. The methods integrate ecological knowledge and technology-based process innovations.«

Prof. Dr. Harald Zepp

Cooperation Partners

German Partners

- ILS – Research Institute for Regional and Urban Development GmbH

Cooperation Agreements with German Partners

- City of Bochum
- City of Gelsenkirchen
- Ministry for Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia
- Bosch and Partner GmbH

Cooperation Agreements with Chinese Partners

- Tongji University, Shanghai
- Joint International Research Laboratory of Eco-Urban Design (Ministry of Education), Shanghai
- Shanghai University
- Chinese Academy of Sciences in Beijing
- Obermeyer Engineering Consulting
- energydesign (Shanghai)

Project Coordination

Prof. Dr. Harald Zepp
Ruhr University Bochum

Faculty of Geosciences

☎ +49-(0)234 32 23313

✉ harald.zepp@rub.de

geographie.ruhr-uni-bochum.de/forschung/angewandte-physische-geographie/forschung/imecogip

