



Urban Agriculture (UA) as an Integrative Factor of Climate-Optimised Urban Development, Casablanca, Morocco

Overview and Findings to Date

The urban growth centre to be studied is defined as the Grand Casablanca region. It is the largest urbanised region in the Kingdom of Morocco, with 3.6 million inhabitants in 2004 and an estimated population of 4.6 million in 2015.

The recent dynamics of the Moroccan economy can be observed in its economic hub: Casablanca is in the midst of a process of rapid transformation and modernisation. The peri-urban region is increasingly shaped by expanding neo-industrialisation and residential activities, creating pressure on neighbouring landowners and farmers, while informal settlements are spreading unchecked close to these areas. Although the Grand Casablanca area is the industrial and commercial heart of the kingdom, the project aims to analyse and examine to what extent Urban Agriculture can make a relevant contribution to climate-optimised and sustainable urban development as an integrative factor in urban growth centres. Urban Agriculture is understood as every form of informal or formal agricultural production within a city, whereby in the context of urban growth centres “city” equates to the urban region.

The project therefore places the three dimensions of agriculture, urban development and climate change together in a new perspective framework, whilst simultaneously placing all three in a new operational constellation under the heading “governance”. The examination of Urban Agriculture as a factor of megacities development emanates from its peculiar spatial patterns. We consider the specific spatial development of megacities as polycentric dynamics including different parallel running growth rates. Between very fast developing growth centres the

growth corridors possess more damped development dynamics. As a result, the reciprocal urban-rural linkages develop new hybrid and climate-sensitive forms between rural and urban space and will shape the nature of future urban development and living conditions. Agricultural utilisation occurs in sub-areas within various time-scales, ranging from “intermediate use of potential construction land” to “sustainable long-term rural islands” in the urban region.

Key factors affecting these urban-rural linkages are the mechanisms of land utilisation and land utilisation distribution as influenced by informal developments.



It is to be assumed that Urban Agriculture will only be able to coexist in the long term and in a qualitatively meaningful manner with other, economically stronger forms of land utilisation when synergies between urban and agricultural uses arise. The project will explore the existence of such synergies or investigate how they can be developed. An underlying hypothesis is that these reciprocal urban-rural linka-

ges contain the potential for a qualified coexistence that can be exploited as a basis to form sustainable climate-optimised, multifunctional urban and open space structures. It can be used for the development of new urban open space systems based on productive landscapes.

Objectives of the Project

Due to the underlying characteristics of megacity dynamics, the project presumes that the production of urban space no longer occurs by means of planning in the traditional sense. Instead, the process requires a multi-strategic approach that equally encompasses the development of new planning instruments and the linkage of top-down with bottom-up strategies, as well as the development and introduction of tailor-made technologies, special educational and communication strategies.



The fundamental aims of the project are:

- to raise awareness for a new megacity-specific inquiry in an inter- and transdisciplinary context,
- to concentrate and refine the precision of the topic as a contribution to climate-optimised urban development,
- to initiate and stimulate implementation in the various stakeholder processes,
- to contribute to the fight against poverty.

The four main research questions are:

- To what extent can Urban Agriculture play a significant part in adapting to the consequences of climate change, in climate protection, and in energy efficiency?
- To what extent is Urban Agriculture an innovative strategy for sustainable land conservation of urban space in tomorrow's megacities?
- To what extent can Urban Agriculture contribute to the struggle against poverty?
- How can Urban Agriculture be integrated as a crucial element of urban development in accordance with local conditions?

Expected Contributions to an Energy- and Climate-Efficient Development of Future Megacities

Knowledge, Technologies and Performance

Over the coming decades Morocco will not only be faced with drastically rising air temperatures, but also with decreasing precipitation accompanied by increased precipitation variability. Thus, it can be expected that the high vulnerability of agriculture to climate change and environmental influences due to the prevailing economic and social conditions will result in powerful adjustment pressures. Moreover, the urban population will likewise be exposed to increased risks. The exemplary development of climate-optimised and energy-efficient forms of Urban Agriculture is one method of achieving a reduction of greenhouse gas emissions and adapting to climate change. For this purpose it is necessary to translate the climatic projections from global climate models into specific regional measures. Key components in terms of adaptive strategies are energy efficiency and the use of water as a resource.

Envisaged performances of the project are:

- scientific methods and concepts to assess the interplay between climate, energy consumption, agriculture and the urban-rural linkage,
- scenarios for future urban-rural development
- analyses of megacity-specific spatial patterns and processes,

- implementation of four action-research driven pilot projects on Urban Agriculture,
- tools and guidelines for the Grand Casablanca region,
- knowledge transfer and transferability,
- outcomes and recommendations for optimising the communication in an intercultural, inter- and transdisciplinary project.

Applicable Instruments, Tools and Methodologies

The project will generate extended scientific knowledge and concrete ready-to-use applications.

Three research levels shape the initial point:

- major issues of research and policy orientation (macro level),
- generic concepts and solutions (meso level),
- action research-driven activities in the form of pilot projects (micro level).

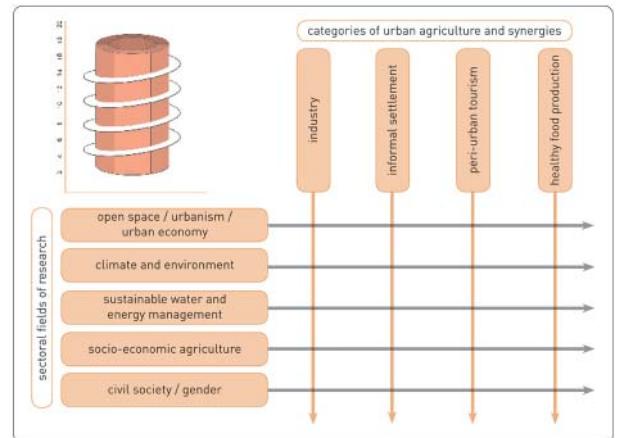
Three activity blocks will accompany the reciprocity of the research levels:

- service activities (capacity building, communication),
- implementation support activities (strategies, toolbox, action plan),
- synthesis activities (scientific exploitation of results, transferability check of results, assessment, potential for scaling up).

A spiral-shaped work methodology ensures that new insights are processed and allows for the integration of scientific and non-scientific approaches, being composed of horizontal and vertical structures. Four pilot projects (Industry and Urban Agriculture, Informal Settlement and Urban Agriculture, Peri-urban Tourism and Urban Agriculture, Healthy Food Production and Urban Agriculture) specify the synergy potentials between city and agriculture.

Capacity Building, Integration and Networking of Institutions

The democratisation process in Morocco involves a reorientation of urban development policies and the active involvement of civil society processes,



and as such can be considered exemplary for the MENA region (Middle East North Africa). Among the various participants in the joint discussions to date who expressed a similar sentiment it was the sociologist and writer Fatema Mernissi who most stressed Morocco's role as a model for the Arab world and the African continent.

In terms of the research objectives and the methodological starting-points, it has already been possible to undertake an initial transfer of knowledge to other regions.

Particular scientific aspects are:

- creation of a network of actors,
- identification of further needs for scientific collaboration between Morocco and Germany,
- using the insights identified in the research project for the development and implementation of other concerted research and development projects,
- identification of potentials for future joint Moroccan-German (private and/or public) ventures especially in the fields of science and technology, the economy, social engagement and common general policies,
- joint raising of public funding to implement follow-up benefits for specific technology-based modules.

Socio-Economic, Integrative and Overall Sustainability Aspects

The development of an Urban Agriculture knowledge base will work as an open source project. It will be

made available to all stakeholders with an interest in Urban Agriculture, climate change and the sustainable development of megacities.

The enhancement of regional economic-orientated Urban Agriculture activities will lead to the development of local economies, for example market-oriented production of high-quality-food and the provision of new urban services for peri-urban tourism and leisure/recreation. An important factor will be the coming changes in the food market sector due to the anticipated new launches and expansion of supermarket-chains, which may well choose to include regional products in their assortments and attach greater importance to certified product quality.

Development of specific technical products:

- zero-energy greenhouses and irrigation techniques,
- settlement-integrated systems of water-reuse linking industry and agriculture,
- interfaces between high-tech water-treatment-systems and low-tech irrigation-systems,
- settlement-integrated systems of decentralised sewage plants linking water cycles between settlement and agriculture.

This range of tools presents particular opportunities for engagement and know-how transfer of small and medium-sized German enterprises, as already incorporated into the project such as the association Fachvereinigung Betriebs- und Regenwassernutzung e.V. and others.

German Partners

- Berlin Institute of Technology (TU Berlin):
 - Department of Landscape Architecture and Environmental Planning, Chair of Landscape Architecture/Open Space Planning (project coordination)
 - Department of Ecology, Chair of Climatology
 - Department of Process Engineering, Chair of Chemical Engineering
 - Centre for Cooperation (ZEK kubus)
- University of Hohenheim, Department of Social Sciences in Agriculture, Chair of Agricultural Communication and Extension

- Bergische Universität Wuppertal, University of Wuppertal, School of Architecture, Chair of Economy of Planning and Building
- Association for Rainwater Harvesting and Water Utilisation (fbr e.V.), Darmstadt

Cooperative Partners in Host Country

- Hassan II University Ain Chock in Casablanca, School of Sciences, Chair of Hydrosience
- National Institute of Urban Planning in Rabat (INAU)
- Hassan II University Mohammedia in Casablanca, School of Sciences Ben M'Sik
- Institute of Agronomy and Veterinary Medicine Hassan II in Rabat, Waste Water Treatment and Reuse Unit (IAV)
- Association Synergie Civique, Casablanca
- Regional Authority of Land-Use Planning, Water and Environment in Casablanca (IRATE)
- Regional Authority of Agriculture in Casablanca (DPA), Casablanca
- City Planning Authority in Casablanca (AUC)
- National Weather Service in Casablanca (DMN)
- Association Al Oukhoua for the Development of the Oued El Maleh Valley
- Association Terre et Humanisme
- School of Oulad Ahmed, Douar Hmar
- Moroccan National Airport Office in Casablanca (ONDA)

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