Urban Pathways

Factsheet

Urban Agriculture

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The Urban Pathways project helps delivering on the Paris Agreement and the NDCs in the context of the New Urban Agenda and the Sustainable Development Goals. It has established a facility in close cooperation with other organisations and networks active in this area to support national and local governments to develop action plans and concrete implementation measures to boost low-carbon urban development. This builds on UN-Habitat's role as "a focal point on sustainable urbanisation and human settlements including in the implementation and follow-up and review of the New Urban Agenda". The project develops national action plans and local implementation concepts in key emerging economies with a high mitigation potential. The local implementation concepts are being developed into bankable projects, focusing on the access to urban basic services to create a direct link between climate change mitigation and sustainable development goals.

Project concept

The project follows a structured approach to boost Low Carbon Plans for urban mobility, energy and waste management services that deliver on the Paris Agreement and the New Urban Agenda. The project works on concrete steps towards a maximum impact with regards to the contribution of urban basic services (mobility, energy and waste management) in cities to global climate change mitigation efforts and sustainable and inclusive urban development. This project makes an active contribution to achieve global climate change targets to a 1.5°C stabilisation pathway by unlocking the global emission reduction potential of urban energy, transport and resource sectors. The project will contribute to a direct emission reduction in the pilot and outreach countries, which will trigger a longer term emission reduction with the aim to replicate this regionally and globally to make a substantial contribution to the overall emission reduction potential.

Project aims

This project implements integrated urban services solutions as proposed in the New Urban Agenda providing access to jobs and public services in urban areas, contributing to equality and social coherence and deliver on the Paris Agreement and the Sustainable Development Goals. This is the first dedicated implementation action oriented project, led by UN-Habitat to deliver on inclusive, low-carbon urban services. Securing sustainability and multiplier effect, the project aims to leverage domestic and international funding for the implementation projects that will follow from this initiative.

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Most of the cities depend on conventional industrial agriculture. Despite its productivity gains in recent decades, its environmental and social costs are neglected which makes it unsustainable. The use of pesticides/fungicides and fertilisers contributes to the extinction of species and pollutes groundwater. The global value chains lead to increasing food transportation and cultivation methods which degrade soils and require enormous quantities of water. Agriculture is also a key driver of climate change, accounting for almost a quarter of all greenhouse gas emissions. In view of a growing world population, especially in cities, an alternative way of agriculture is needed and urban agriculture has been started. Urban agriculture refers to the cultivation, processing, and distribution of agricultural products (crops, animals, non-food products (e.g. aromatic/medicinal herbs)) in urban and/or peri-urban areas, which are sometimes unused or underutilised. The scale of urban agriculture broadly ranges from individual and family farms on balconies, roof-tops etc. for self-consumption to community farms and commercial enterprises. It focuses on intensive land usage (such as, use vacant municipal land and integrate it in urban land use planning) and organic farming methods and sees agriculture as a closed-loop system, that brings food production and consumption together. Compared to conventional industrial agriculture it is integrated into the urban economic, social and ecological system. Cities will not only benefit from the improved micro-environment (e.g. less pollution and waste management, reduced heat island effect) but will also gain social (e.g. health, social integration, food security) and economic (e.g. reduced food transport, jobs, tax income) benefits. Local authorities can influence and support urban agriculture through various urban policies and plans.

In brief

There are various forms of urban agriculture which cities can choose according to its local context, such as:

Guerilla gardening – Guerilla gardening is a form of urban gardening in which mostly abandoned or neglected areas are cultivated without the owners' permission. It was originally evolved as a form of political protest. Today, gardeners want to raise awareness of abandoned land and actively contribute to increasing the attractiveness of cities. This is why plants are often for aesthetic purposes (like flowers). Food production is rather a side effect. Guerilla gardening has its origin in London but now exists around the world. In Welland, Canada a disused area was reclaimed by local residents creating a "Guerilla Park". In Copenhagen, an abandoned area was transformed into a garden in a single night. The International Sunflower Guerilla Gardening Day is on May 1st and can be a good starting point to initiate local activities. Cities should allow Guerilla gardening, especially in urban areas that are not intended to be used in the long term (e.g. traffic islands).

Urban gardening/farming – Urban gardening/farming is an agricultural practice within city boundaries or peri-urban areas. It includes growing, processing, and distribution of food through intensive plant cultivation and animal husbandry in brownfields and also on rooftops, terraces and balconies etc. The term refers to not only small non-profit gardens at the neighbourhood level, where subsistence, common welfare and social interaction are of primary importance but also to commercial community gardens and enterprises. The project can be of temporary (interim use) but also of permanent usage. Good examples exist in Berlin (Prinzessinengärten) or in many shrinking U.S. cities like Detroit, Chicago or Cleveland. The Prinzessinnengärten has revitalized an abandoned area of 6,000 m2 . Its plant beds are made of recycled bakery crates and both the beds and the buildings are designed so that they can be moved at any time or reassembled elsewhere. It has also become a place for social interaction and integration.

Vertical farming – Vertical farming is an indoor agricultural strategy to growing food in protected environments (e.g. skyscrapers, warehouses, glasshouses, shipping container) with sophisticated agricultural methods such as hydroponics/aeroponics or aquaponics. It is under controlled environmental circumstances (humidity, temperature, gases etc.) and uses advanced systems such as mimic sunlight (artificial

Examples
Measures

lights, LED, metal reflectors etc.)(Lu & Grundy, 2017). Examples exist in Kyoto (Techno Farm Keihanna), Lindköping/Sweden (World Food Building) or Newark, New Jersey (Aerofarms). So far, vertical farms are mainly used for crop production, but can also be seen as labs and production sites for cultured meat (in vitro cultivation). The challenge in vertical farming is the enormous power requirement for lighting, sensors, ventilation and filter systems, the high investment costs and the complex interplay of different technologies.

For a long time, settlements and food production were spatially very close to each other. At the beginning of the 20th century, the "garden city movement", an urban planning concept existed, where areas of industry, residences, and agriculture, were proportionately located from the communities. With the industrialised agriculture the proximity was more and more substituted by open loop systems and distances between food production and consumption became larger. The alternative forms of urban agriculture try to transform cities from food consumers to producers. Some of the benefits that cities can achieve with urban agriculture are as such:

•   Microclimate improvement – Green zones from urban agriculture has the potential to reduce urban heat island effect by lowering temperature and increase humidity. It filters dust and polluted air, reduces noise and creates shadows.

•   Biodiversity – Urban agriculture offers a high level of biodiversity through managed plant communities (fruits and vegetables) that influence ecosystem services.

•   Reduced global warming: Closed-loop systems bring food production closer to communities and nearby markets, thus reduce transportation emissions. Plants, trees and other forms of biomass also capture CO_2.

•   Waste management/reduction: Urban agriculture utilizes most of the urban waste into productive resources (i.e. organic waste as a fertilizer and urban wastewater for irrigation). Local food production and distribution reduce food packaging.

•   Social movement – Urban agriculture can increase the demand for organic food production that is comparatively healthy. Urban farming also contributes to social interaction and community development, which supports a sharing system. Moreover, it also contributes to poverty alleviation and social integration of neglected groups (unemployed, elderly people, women, disabled people etc.) by providing the opportunity for a decent livelihood.

•   Food security – Urban farming contributes to self-sufficiency, increases independence from global food prices and produces affordable food. It addresses urban poor with insufficient food accessibility and lack of purchasing power, particularly in fast-growing cities in developing countries. Subsistence through urban farming reduces expenses for food and generates additional income from sales of surpluses.

•   Environmental awareness – Local production creates awareness of the value of organic food, the consequences of industrial agriculture and the benefits of organic production methods. This may re-

Results

duce food wasting and also the willingness to pay for healthy, organic and local food.

• Economic benefits – Local production creates jobs and tax income. It may also stimulate the development of micro-enterprises, e.g. (transportation, bookkeeping). Growing food at home also saves households expenditures on food and selling it provides additional income. It may decrease urban waste management costs and the energy used for food transportation.

The technologies used and thus also the financial costs and risks are heavily dependent on the above-mentioned forms of urban agriculture. Urban gardening in a household and small neighbourhood usually do not require significant capital. On the other hand, the construction costs for the vertical farm "World Food Building" are estimated at $ 40 million (Garfield, 2017). For all forms of urban agriculture, local authorities (or private owners) have to provide land, which is less of a problem in shrinking cities than in growing cities where trade-offs can occur. Although financial return/ benefits of the use of land for urban agriculture is lower than for residential or commercial purposes, local authorities need to be aware of the benefits mentioned above and encourage citizens and create a suitable environment to go for it.

Technical & Financial Considerations

Local authorities should provide areas to local initiatives for urban agriculture (de Zeeuw, Gründel, & Waibel, 2000). This includes a legal framework for temporary or permanent land tenure and an inventory of available areas. To reduce initial capital, initiatives can, for example, be granted the free use of municipal land, if it is used for the public good. Reserved areas can be recorded in land-use plans (zonification plans) or even in subdivision or district development plans. This ensures a long-term perspective for initiatives and increases the willingness to invest in infrastructure development, rather than just the investment in residential or commercial space. Moreover, it allows local authorities to specify the type of activities allowed (e.g. types of crop plants), plan the city with production and consumption nearby. Likewise, cities can negotiate agreements with private owners of brownfield sites redevelopment for temporary use. Cities can also provide start-up financing or reduce operating costs through low-interest loans, grants or waived fees for initiating urban agriculture. The city of Cleveland, for example, grants subsidies for the purchase of equipment, greenhouses, rain barrels, etc (Hagey, Rice, & Flournoy, 2012). They could waive land taxes and pay lease fees to private owners. Likewise, urban farmers can get free or discounted access to urban services (water, compost, waste, tools). Cities can also help with the distribution of products (e.g. purchasing by public institutions, authorising farmer markets, direct marketing etc.). Urban agriculture can also be integrated into new public housing projects. Finally, cities can provide, training, technical and management assistance and communication skills to urban farmers and communities. Cities can also provide budget and expertise for local technology development. Especially for vertical farms, it may be necessary to change land use plans.

Policy
Legislation

Urban agriculture has so far hardly been institutionally anchored and most of them are initiated by communities or civil societies. National Ministries of Agriculture are usually not responsible for local actions, and there are hardly any association or network structures supporting urban agriculture. Urban agriculture should, therefore, have a clear ministerial assignment (in the Ministry of Agriculture) at a national scale. Due to the multi-dimensional nature of urban agriculture, there are many overlaps to other ministries, an interdepartmental working group should also be established (de Zeeuw et al., 2000). At the local level, there also has to be an institutional home (e.g. Department of Economic or Urban Development) supporting urban agriculture. The task of cities should be to find the initiators and develop supporting framework conditions (see policy/legislation). Databases with good practices and lists of actors, workshops, exchange visits or stakeholder platforms, coordinated by national or local agencies can be used for networking.

In addition, local business development could address the issue, as local added value is created. Urban agriculture projects can be supported by people from the secondary labour market (e.g. unemployed, disabled people, pensioners). Ministries (Agriculture, Health, Interior) can support such projects by labelling healthy, organic and local food to raise awareness among buyers. In addition, there can be support programmes for start-ups, but also for projects that are oriented towards the common good and/or promote social interaction. Distribution of food production can be facilitated by initiating and supporting local markets. Vertical farms require research, which should be tendered and financed by the Ministry of Research.

Institutions

Urban agriculture is practiced all over the world in a smaller or bigger scale. Various networks (such as social media and exchange programmes) have helped to promote and to transfer urban agriculture at many cities (nationally and internationally). Local conditions (e.g. climate, water availability, historical cultivation techniques, etc.) must, of course, be taken into account for transferability. Likewise, the success of urban agriculture projects oriented towards the common good is strongly dependent on the early involvement and support of the various stakeholders, mainly committed local citizens. Vertical farms hardly exist so far, so that it is difficult to define success factors for transferability.
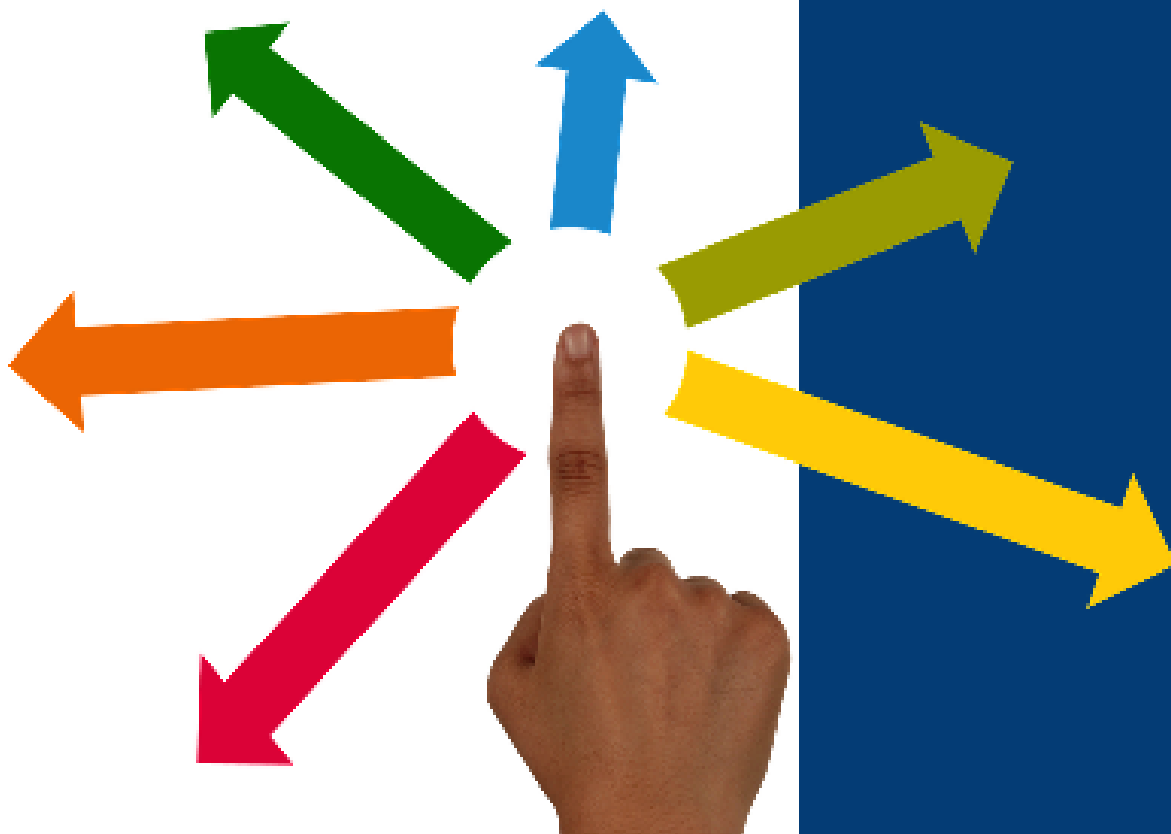
Context

Mumbai has experienced enormous population growth in recent decades and is now one of the most densely populated cities in the world. Despite the high growth and construction activity, Mumbai also has numerous areas that can be used for urban agriculture. Unused and abandoned land can be used at least temporarily. Balconies, terraces and rooftops can also be utilized. In recent years, various organizations have attempted to develop these areas for urban agriculture.

In action

City Farming is a local based NGO in Mumbai, that offers workshops to school students, residents, and corporates for small-scale food production on balconies, terraces etc. In the workshops, production methods according to the thoughts of Dr. R T Doshi were shared. Hereby, household items (e.g. plastic container) and organic waste as fertilizer are utilized for home food production. This cultivation method helps to recycle organic waste and reduces municipal waste management cost, makes optimal use of available space, produces food at reasonable costs and increases economic and entrepreneurial activities in the city . Fresh&Local is a local organisation in Mumbai that has established various pop-up gardens in recent years. They offer not only gardening workshops, but also workshops on other topics (e.g. security for women). Most gardens are DIY (Do it yourself), but they also cooperate with various institutions, e.g. they supply a restaurant ("The Table") with fresh food. In the future, small shops will open, in which Mumbaikars can buy starter kits for gardening. Urban Leaves is another organisation, which has led many urban garden projects, including the development of Mumbai's first urban community farm within the Maharashtra Nature Park in 2009 . "The Farmers´ market" also exist in Mumbai that connects local and regional producers with local buyers, who look for organic food and want to support local business .

Results

The various organizations in Mumbai have managed to raise awareness of the value of healthy and organic food and the possibility of urban farming in the city. The different projects are accompanied by a variety of co-benefits. Planting balconies and roof-tops lower the high temperature of homes in Mumbai. Households receive affordable and healthy food, transportation is reduced and new sources of income are created. Urban gardens have supported the improvement of Mumbai's air quality and temporarily buffer rain during monsoons.

Results

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