

INTRODUCTION OF URBAN AGRICULTURE

**Master Study Program Urban Agriculture
Teaching Material/ 2021**

Introduction....

- City development Declining number of arable land Is urban agriculture the answer?
- Answer to over suspected cities?
- What opportunities does it provide?
- roofs, terraces and green spaces in urban zones.

Facts

- Local farming reduces the "mileage" of the food we eat, which means that it does not have to travel for days to the supermarket and dawn along the way in a transport container.
- Under ideal conditions, we should consume foods within a few hours of picking as their quality drastically declines even if properly stored at optimal temperature and humidity.
- Lettuce, for example, loses 46% of its nutritional value within 7 days of picking. Within 8 days in the refrigerator, spinach loses 22% lutein and 18% beta carotene.



UNDP

- The United Nations (UNDP) identifies over 40 different forms of urban agriculture:
- from gardening (vegetables, fruits) to aquaculture, from small gardens for household needs to larger gardens earmarked for sale (market),
- including breeding a variety of livestock – from poultry, rabbits and goats to growing snails, silk beetles and bees.
- Food production in cities is handled by nearly 800 million people, who produce about 15% of the world's food in total.

Characteristics

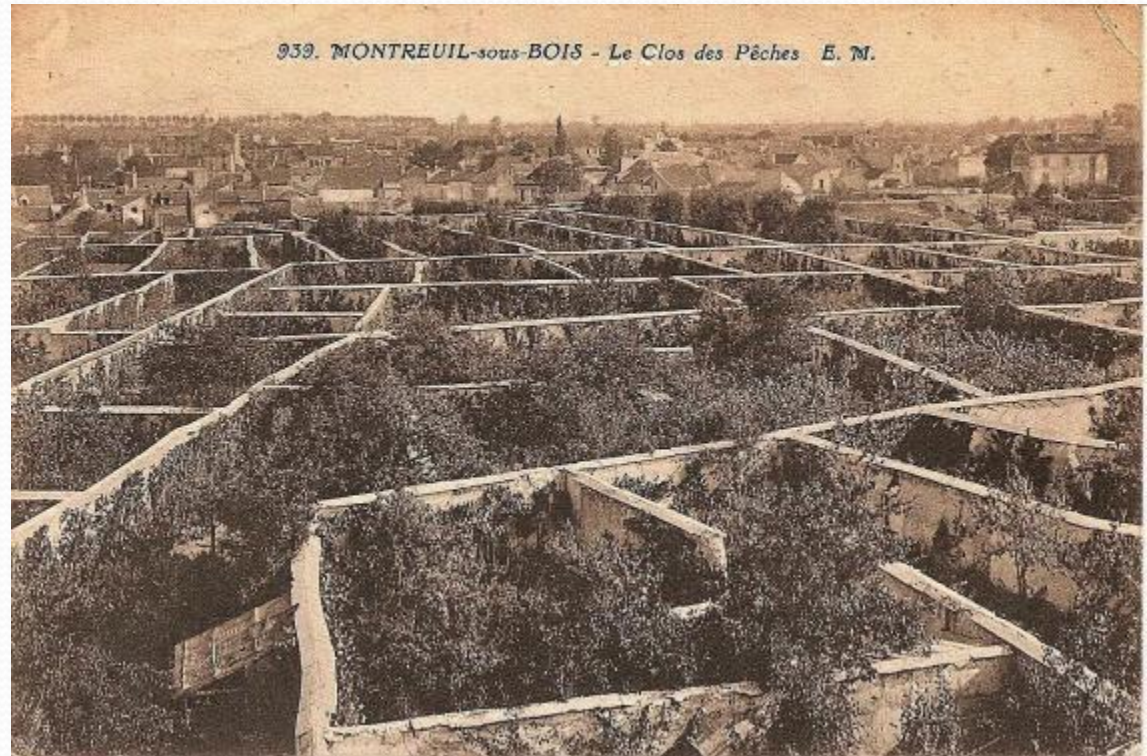
- The main characteristic of urban agriculture is local food production for local use – a concept that ensures:
- employment of the population,
- cultivation of urban and suburban areas,
- more food and healthier nutrition,
- increasing the economic power of the city and residents,
- stronger connections between residents.
- A typical method of production in urban agriculture is a bio-intensive method – which produces large quantities of organic food over limited areas.
- Despite the exceptional importance of this activity in providing food for a part of the city's population, as well as its importance in recycling urban garbage of organic origin, local authorities most often prohibit the production of food in cities or treat it as a necessary evil.
- With a few exceptions, food production in cities was carried out without institutionalized assistance from agricultural experts and urban planners.

History of urban agriculture

- Back in ancient Persia, organic waste from cities used is for urban agriculture.
- Machu Picchu is a well-known example of the reuse of water to irrigate green terraces for food production.
- During the world wars in the US, Canada and the UK, the concept called Victory Garden was applied - planting food on private plots but also in public parks.
- In Germany, in the early 19th century, there were 10,000 people in The Hague.
- In the 19th century, a gardening system appeared on parcels from 400 to 500 m² that were given for use by individuals for little or no fee – allotment.

„Fruit walls“

- So-called fruit walls Long before the greenhouse, walls are erected that provide all the characteristics of microlocations

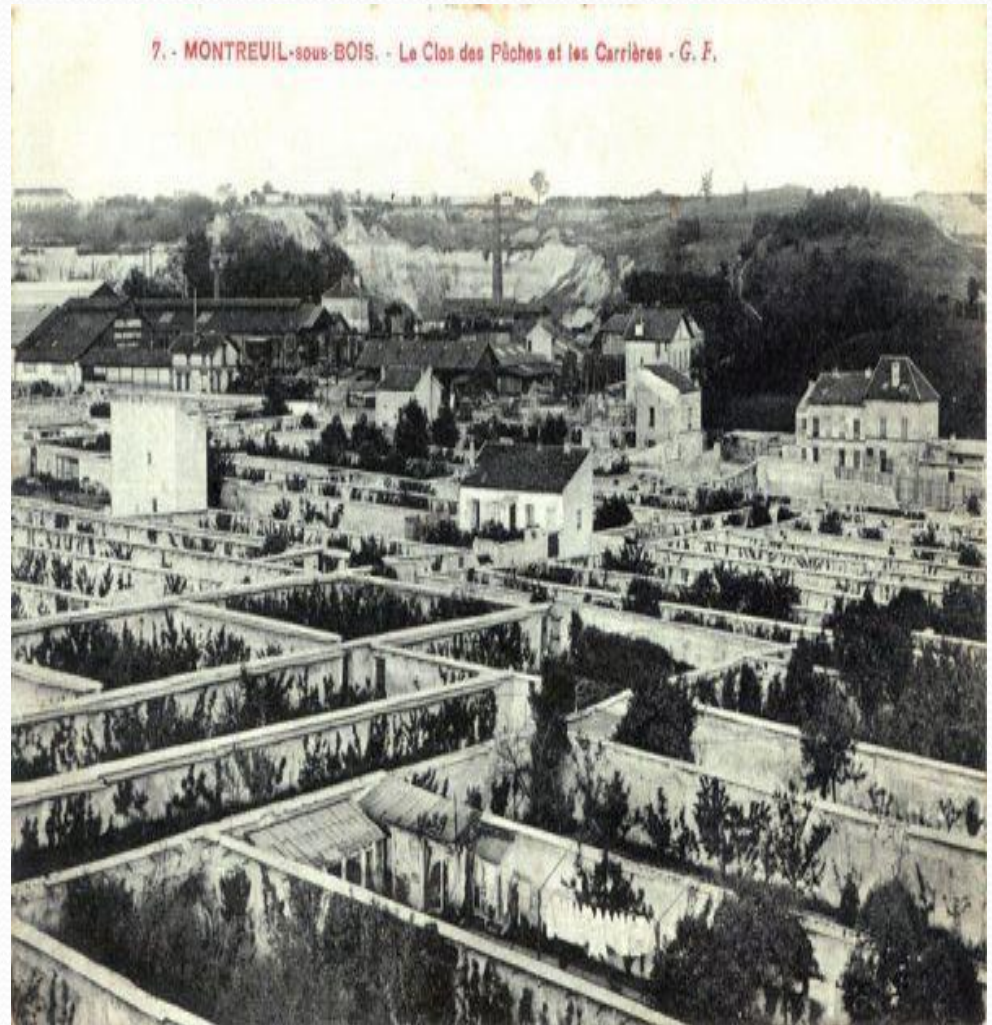


„Fruit walls“

- Back in 1561, a Swiss botanist named Conrad Gessner noticed the favorable effect of heated walls on fruit growth
- The walls surrounding the plantings not only provided protection against wind and animals, they also protected against the sun by creating more stable local microclimates while protecting them from frost
- This was especially useful for farmers who wanted to sneer sensitive crops in the north
- Also this was extremely useful in a period that reverents as, "Little Ice Age" (little ice age), during the global cold period of the early 17th century

„Fruit walls“

- Thermal "fruit walls" were very popular during this period
- They allowed farmers to grow Mediterranean crops - fruits and vegetables - in the north as in England.
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- By absorbing the sun's energy during the day, these walls were in possibilities to raise powerful temperatures for 10 degrees



Curved walls in the Netherlands

- Keep more Heat



- Urban agriculture produces about 15% of the world's food, and interest city population for this type of activity is increasingly Grow.
- In richer societies, the focus on healthy eating and treatment of alienation according to nature and neighbours, in developing countries the development of the local economy is primal.



Who engages in urban agriculture?

- In richer societies, the focus on healthy eating and treatment from alienation towards nature and neighbours, in developing countries, is the primary development of the local economy.
- In some countries, such as Russia, it is a national pastime, providing nearly half of total agricultural production.
- In Europe, more than three million urban populations are engaged in some kind of urban agriculture, primarily to eat healthy, cure alienation towards nature and neighbours, and then to fill the household budget.
- These activities are most prevalent in the cities of developing countries in Africa, Asia and South America, characterized by insufficient population employment and relatively low standards, priorities are there is something different, i.e. most focused on the development of the local economy.

"my garden, my freedom"

- The attitude of "my garden, my freedom" unites about 800 million city dwellers across the planet, producing a total of about 15% world food.
- According to the UN, today there are over 40 different forms of urban agriculture, from growing vegetables and fruits to aquaculture, from small garden plots for the needs of one household to larger ones, intended for production for sale, including breeding various types of livestock, starting from mercury, rabbits and goats, to breeding snails, silkworm and bee-growing.



The growth of interest in such activities, as well as the trend for urban agriculture to become a "hot" topic of sustainable development, rests on several arguments cited in its favor: recycling of organic waste, production of healthy food, reducing the need for transport while greening urban areas – and therefore reducing the effects of the glass garden, to the growth of the economy creating new jobs.



Growth of the
economy creating
new jobs

Production of healthy food



Roof gardens




Modern vertical breeding



Russian national pastis

- Many examples are cited as successful in economic systems that, although they fall under the same category of "developing countries", achieve this development at very different speeds.
- The home garden model is so successful in Russia, the yield amounts to almost half of the country's total agricultural production.
- This share is steadily increasing as more people join the movement of ecological villages, write the American newspapers
- The Bovine and Pro Liberty, which with elation and even euphoria represent the Russian model of food cultivation in their own backyard with the encouragement of the state: "Imagine a network of uncentrallled, economically viable, independent 'eco-villages' produce more than enough foods to feed the whole country.

- Russia remained before, during and after the "Soviet era" recognizable by the tradition of "city estates", whether it is gardens within the guards, or the custom that the largest part of the city's population spends their holidays in cottages with garden, popular dachas.
- Going to the dachia, where its own fruits and vegetables are cultivated, is perceived as a kind of national pastime, since according to the All-Russian Center for the Study of Public Opinion (VCIOM), 48% of the inhabitants of Russian cities own an out-of-town property, of which 27% are given.
- According to the same source, last year 61% of Muscovites flying at the dachia, and the Russians themselves like to say that Asia in the garden rests to work better, while in Russia they work to rest growing fruits and vegetables on the dachia.

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- Given the industrialized mass production with the help of chemistry and genetic engineering it sounds like utopia, but the country described is Russia in our time.
 - As it turned out, the model of today's Russian agriculture flourishes through millions of small family-owned estates, which are guided by the principles of organic agriculture."
 - Based on data from the state Statistics Agency, there are 35 million families in Russia (which is about seventy percent of the population), which produce more than 40 % of Russia's agricultural production on about 8 million hectares of land.
 - Food is largely grown in urban environments, including among the more affluent population, and in this way 59% of milk, 65% of meat, 76% of vegetables, 79% of fruits and 91% of potatoes are produced.

China

- the Chinese city of Shanghai (data from: RUAF – Why Urban Agriculture?), which according to the 2000 census has about 17 million inhabitants, gets from its urban and peri-urban territories about 60% of urban vegetables, 100% milk, 90% eggs and 50% of the required amounts of pork and mercury meat.

Cuba

- In Cuba, the more intensive development of urban agriculture began only with the fall of the Soviet Union, when the Cuban economy, due to the embargo, lost more than 85% of its external income, imports declined by about 80%, including food, and GDP "melted" by more than one-third.
- Given the lack of fossil fuels, intensive agricultural production has fallen dramatically, so Cuba has turned to renewable energy sources and local organic production.
- Since the early 1990s, the proclamation of urban agriculture has spread rapidly, so in the capital Havana with about 2.2 million inhabitants, today about 50% of vegetables come from the city itself, while in other Cuban cities urban garden produces 80 to 100% of the necessary fruits and vegetables.

United States

- The U.S. has been a hotline for new urban gardening movements since the early 1980s, when the trend began with small gardens with vegetables, spread in so-called common courtyards or abandoned city plots.
- In developed countries, urban agriculture originally developed in economically devastated areas, in neighbourhoods that suffered changes after deindustrialisation, when factories closed transformed into green spaces.
- High unemployment and high rents in inner city centers have conditioned that neglected plots around the perimeters of the city come to life in the form of common courtyards, in which the crowd began to grow food.
- The system used today for the production of food in urban environments is common gardening – on certain plots food can be grown by several users (community gardening). P-Patch is a well-known concept of this kind characteristic of Seattle, USA.

P-patch

- Informal places of gathering and socializing Help from city authorities



EUROPE


- In London alone, around 1,500 vegetable growing sites opened in 2008, and around 500 urban agriculture projects were launched in Paris in 2013, as the interest of residents to engage in this activity is huge, as is the demand for this type of food.
- In Belgian cities, authorities give their citizens cages with two coca carriers each, and Britons are also allowed to keep cock-carriers and beehives in cages in the garden of the city's family homes.
- The same scenes can be seen on the roofs of the soliter and even on the roof of the British parliament, as well as many German, Swiss and Scandinavian cities, in Barseloni, Lisbon... aquaponic fish farming on the roofs of commercial buildings in Brussels and Berlin,


Circular process


- waste, as all raw materials are intended for reuse in technical or biological terms.
- Thus, CO₂, treated wastewater and heat emitted by users of a residential or commercial building can be used to grow plants in a greenhouse on the roof of that building.
- Oxygen-enriched air returns to the building, and cultivated plants may meet some of the nutritional needs of building users.


Recycling


- More than one third of food in rich countries ends up as garbage (the rest of the dishes, expired food, waste when preparing food).
- Most of the city's garbage is actually organic, so collecting it, taking it out and depositing it spends a significant part of the city's budget.
- The decomposition of organic matter in landfills creates methane, a gas that affects global warming and climate change and which, like a glass garden-effect throttle, is thirty times more harmful than carbon dioxide.
- The recycling of organic garbage through urban agriculture takes place through the process of its reuse as a feed, mainly in two aspects:
 - its composting produces organic garbage for plant production and
 - one part of organic garbage is excellent feed for livestock (meat, milk, egg production, etc.).


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- In addition to solid organic garbage, recycling of urban waste includes the use of (partially purified) wastewater for the purpose of irrigation of agricultural land, and in several countries (in Canada, the USA and Austria) there are already phosphorus recycling plants from urban channeling sludge.

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- Cities, as environments where more than 50% live today population of around 70% of Europeans, must meet their biological, environmental, social, economic, aesthetic, as well as other requirements and needs
 - The urban population is increasingly oriented towards consumption, so urban development needs to be directed towards sustainability.
 - Sustainable development of the city can be achieved if renewable energy systems, economic, humane, environmental and technological potentials.
 - Cities create high social mobility, but equally, they can increase the gap between rich and poor citizens in terms of housing supply and housing in the city or the availability of education and social services.
 - Social mobility affects political stability and trust in society, so if it is low it can lead to a distortion of functionality.

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- Furthermore, efficient urban planning enables coexistence different groups located in the city (racial, ethical, religious, etc.) or social equality, which, if not effective, can cause even greater differences between the population and slow down the growth and development of the city.
 - Finally, environmental sustainability is an essential factor in sustainable growth.
 - The high density of residents in one place largely leads to the emergence of environmental problems such as water and air pollution, land destruction, the rapid spread of infectious diseases as well as natural disasters such as earthquakes, floods, etc.
 - Therefore, the prospects for sustainable development of cities in the future will depend on effective planning for the future

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- Concrete measures relate to measures aimed at restoring poor and neglected urban districts; sustainable urban development measures in thematic areas such as:
 - Increasing competitiveness,
 - Innovation
 - Employment physical restoration of urban areas and urban cores,
 - improving urban infrastructure such as transport and treatment wastewater, as well as housing conditions, measures aimed at promoting more balanced, polycentric development involving networking cities and connecting economically strong cities and other urban areas, small and medium-sized cities

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- The city's population is increasingly oriented towards consumption, so urban development needs to be directed towards sustainability.
 - Cities are "producers" of external environmental impacts, both positive and negative, and by increasing awareness of the different aspects of environmental pollution related to urban lifestyle and quality of life in cities, there is a growing need to rethink the capacity to submit a sustainable city.

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- The capacity to submit a city can be viewed from two aspects: as the city's ability to cope with environmental impacts within and beyond its borders.
 - Internal ones relate to urban waste management, urban water and air pollution, traffic congestion problems, noise, etc., while external ones relate to land use, as well as other resources necessary to ensure life in the city (e.g. agricultural production, energy, forests, etc.)


- Urban agriculture is an agricultural branch related to the cultivation, processing and distribution of food in populated places, or in their immediate vicinity. It can also be associated with horticulture, animal breeding, planting trees with fruits, aquacultures, etc.
- Urban agriculture can be motivated by the desire to make money, but also by an ordinary hobby in urban environments.
- It can also be implemented as a strategy for hiring people, reducing crime rates, and improving the conditions of life in cities.
- It contributes to the quality of the food chain in two ways: increases the amount of food available for people in cities provides fresh fruit, vegetables and meat for the inhabitants of the cities.
- A common way of growing is a biointensive method – a way of growing which, on as small an area as possible, should produce as much organic food as possible.
- The aim of this method is long-term sustainable agriculture on the principle of a closed system.
- Similarly, it may be applied to smaller commercial Farms.


Facts about cities


speaks in favor of urban agriculture:

over 50% of the world's population lives in cities
800 million people are engaged in agriculture and feed the population
in cities poor population spends from 40 to 60% of their income to buy food

By 2015, about 26 cities around the world will have more than 10 million inhabitants
a city of 10 million people needs 6,000 tons of food each day.


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- Urban and suburban agroculture (UPA) contributes to the economic growth of the city through the production, processing, packaging and distribution of food goods, but also indirectly, through the preservation of the economic power of the population through savings.
 - This process is initiated by other branches of the economy (production of humus, construction preparation of surfaces for growing feed, etc.), and opens new, local, workplaces.
 - This, then, contributes to reducing the price of food due to lower transport but also the availability of fresh food for the population in cities.
 - In this way, urban agroculture contributes to the economic power of the city because the vapors are not poured for the delivery or import of food products.
 - The population is left with more money to buy products they cannot make on their own, and another advantage of local farming is creating better circumstances for raising a family, as parents can stay active at work in close proximity to young children.


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- Food production in cities and suburbs provides a full range of benefits for locals; better nutrition, employment in a workplace that has little or no risk in the workplace, growing food for its own use, establishing stronger social connections among residents, etc.
 - In many parts of the world, it stands out as a particular advantage what this branch of the economy creates jobs for the unemployed female population, which is largely marginalized within the formal economic system in cities.
 - Just look at the presence of women in projects financed by the city: the construction of an infrastructure or public buildings.

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- Given that the use of urban areas most often refers to land and areas that are not owned by users (roofs of garages, public, industrial, commercial and residential buildings, embankments, green spaces, etc.), problems arise in terms of legal regulation.
 - For this reason, the organizations that popularize this branch of the economy publish brochures that need to help local governments solve these problems (one of them is also a Guide to regulation in the field of urban agroculture - Guidelines for Municipal Policymaking on Urban Agriculture, IDCR and FAO).

Nature in cities

- Local food cultivation not only enhances the economy of cities and the economic position of the local population, but also greatly affects the economic strength of the state, but also the ecological image of the planet.
- Namely, today for each product the average transport length is over 2,000km, whereby harmful gases are released due to the burning of fossil fuels.
- There's an old one that nothing tastes better than the fruits of your own garden...
- Although it is a subjective claim, the fact is that you can know what you have used to produce food, which is never the case with the food you buy in supermarkets and even at the market.
- Of course, land in cities can be polluted through air, precipitation, wastewater, etc.
- However, any land can be tested for the presence of hazardous matter, and there are ways to solve problems of this kind, from plant plantings that will purify the land, to larger interventions such as isolating the fertile layer of land from contaminated land.


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- If we decide to design the city in accordance with the concept of local food production, the advantages become even more numerous.
 - The formation of vertical garden plots will positively affect the climate in the facility next to which it is placed, will open the possibility for the accumulation and purification of atmospheric waters that can further serve for irrigation, as technical water for the object, or even as drinking water.
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 - Applying this concept to the whole city relieves water and channeling infrastructure, reduces the effect of hot islands, reduces air pollution and improves quality of environment.



To provide spatial conditions, two mentioned models are mainly used: joint cultivation of food, which means a plot on which several users work, or allotment model where a certain area is divided into smaller plots that users cultivate independently, with joint use of tool storage, etc.

Creating local infrastructure for growing food in urban areas environments implies the creation of spatial conditions and distribution networks from producers to consumers.

To provide spatial conditions, two mentioned models are mainly used: joint cultivation of food, which means a plot on which several users work, or allotment model where a certain area is divided into smaller plots that users cultivate independently, with joint use of tool storage, etc.

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- The next step is to provide a place where manufacturers can sell their products:
 - marketers,
 - supermarket and supermarket chains, but also allow them to have immediate contact with restaurants, hotels, etc.
 - The merger of several manufacturers should also be encouraged in order to be able to achieve a continuous flow of delivery of goods, and therefore, trust with customers.
 - Of course, the local product - food should also be encouraged by campaigns, urban projects, projects reconstruction of roofs of buildings of all types (schools, hospitals, public institutions, but also hotels, industrial buildings, etc.), and especially through new construction projects.



The downsides of urban agriculture

Sustainable

- Not every form of urban agriculture is sustainable
Urban agriculture is a practice of cultivation, processing and distribution food in and around villages, towns
- Behind these ideas is one intention, which is the production of edible plants and their consumption, at and around the place of production

Green buildings

- Some architects have used the greenery to camouflage their glass concrete skyscrapers and place them where they don't belong
- The promoters of this idea only emphasized the assumed positive effect of green buildings on the urban environment:
- Hydroponic and aeroponic water recirculture that significantly reduces the amount of water needed
- Use of rainwater
- Reuse of wastewater



Problem:

- Although buildings like this provide a lot of light for the sake of a large amount of glass, still plants need soil and extra light to survive
- Additional lighting is obtained using LED lamps - high cost LED lamps heat the space, high costs appear to ensure air circulation and control humidity
- Plants must be fed and protected more because they are grown in areas where more frequent disease occurs (fungi)

Milano

- Not a typical example urban farming tenable



Pesticides

- Viticulture Large and inevitable pesticide use In France, a large number of vineyards are located near the towns of Napr. Bordeaux People protest.



Practical problem

- Lack of space
- Consumption of drinking water for Watering
- Water and soil pollution
- Bad looks???



Cities over-polluted





FORMS OF URBAN AGRICULTURE

- Yards
- Neighborhood bastes
- Tactic bastes
- Greenhouses
- Mixed plantings
- Roof gardens Green walls
- Vertical breeding
- Vertical Farms
- Keeping animals
- Urban beekeeping
- Aquaponika

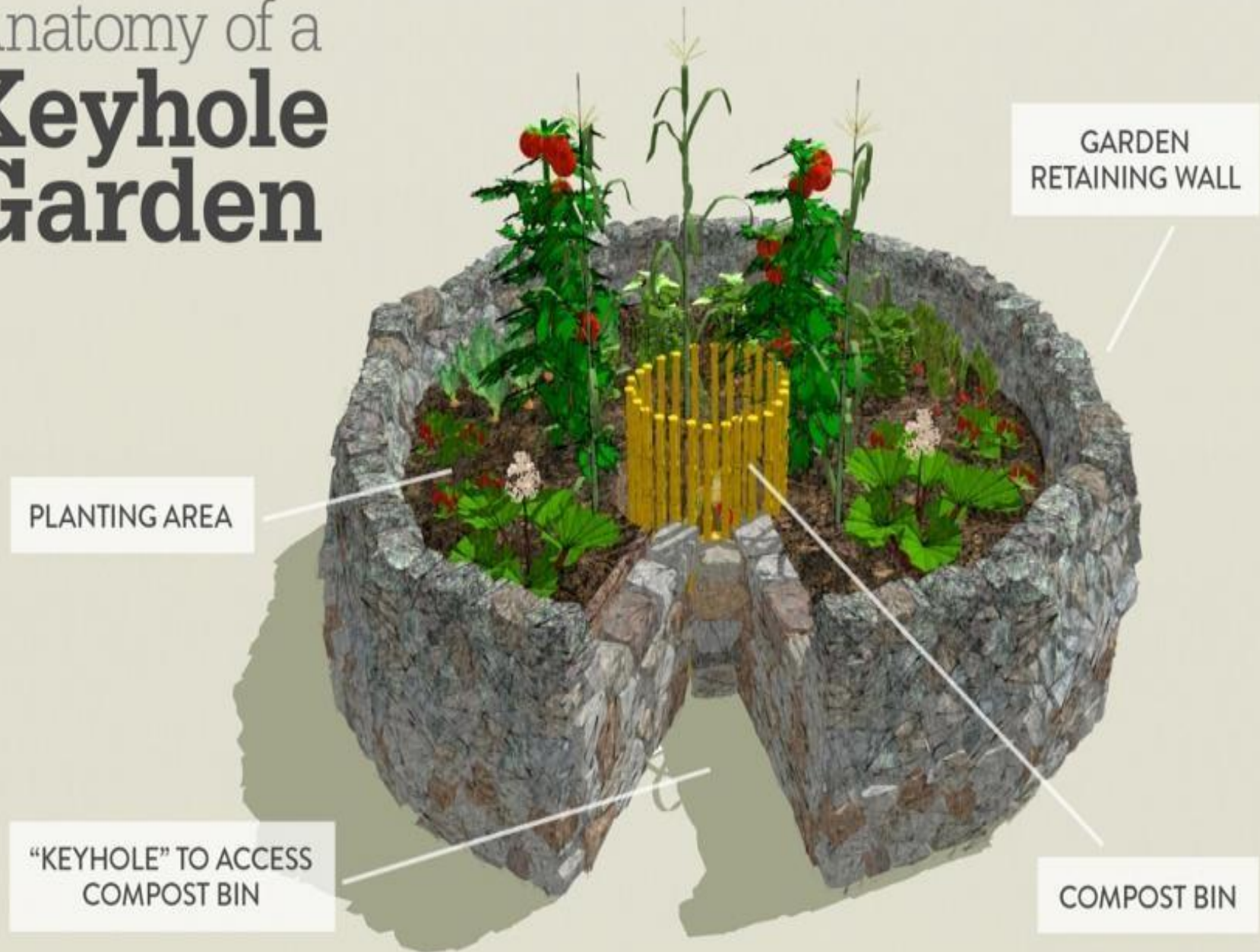
The most experienced
types of urban
agriculture

Tactic baste / gardens

- Original idea from Africa
Small raised flower beds have a composter in the middle
- Access paths have been made for people who want to get to the composter
- That's why they resemble a keyhole
- All organic waste is placed in the composter
- Today they are popular in Europe and Central America





Anatomy of a **Keyhole Garden**



Urban greenhouses



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- Green roofs that are properly installed last longer than a standard roof, producing in addition additional economic advantages that are manifested by reducing costs for taking away rainwater and reducing energy consumption.
 - Ecological rooftops save money for energy spent for both in-flight refrigeration systems and fault systems during the winter.
 - The savings depend on the climate, the size of the building and the type of green roof. But any lowering of the temperature by 0.5 degrees can reduce the amount of electricity by 8%.
 - Most often, facilities containing rooftop gardenes have a higher market value as they represent make "windows into nature" at your fingertips.
 - Ecological roofs absorb precipitation, thereby reducing the load on the channeling system during rains and snow melting.
 - The green roof is also an efficient thermal insulator- in winter it retains heat in the property and flies it cools down.
 - With the help of roofing gardens, more precisely their plants and substrates, the noise level, one of the major problems of living in the city is decreasing.
 - These eco-friendly roofs, often of outstanding design, absorb the harmful effects of polluting throttles. on.

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- Greening roofs often includes creating natural habitats for flowers, aromatic plants but also insects, birds.
 - Green roofing gardens heat up less, and can absorb negative radiation, and therefore affect the improvement of the microclimate around the facility.
 - Another important advantage of green roofs is fire safety. Compared to conventional roofs, they are less flammable.
 - By greening, bloodsuckers have a positive effect on both your own psyche and productivity, recent research has shown.
 - Some of our ecological rooftops are now places for picnics and excursions, although they are only a step away from what

Green roofs

Ecological green roofs consist of layers:

layers of vegetation

substrate layer (growing media)

layer filter drainage

layer protective

layer water-residual layer



EXTENSIVE GREEN ROOF

- Extensive green roofs can be flat or oblique, depending on the roof structure on which they are installed.
- This type of greening of roofs includes plant species that have a small root system and that easily tolerate drought.
- These species belong to the plants of the sedumi, but also to other grass species of the meadow type.
- The advantage of extensive green roofs is reflected in the fact that they can be installed on almost all roof structures, any object, as they have a small specific weight.
- With the fact that each ecological roof is a small ecosystem in its own right, and its maintenance should be done once a year, when checking whether the plants are healthy.



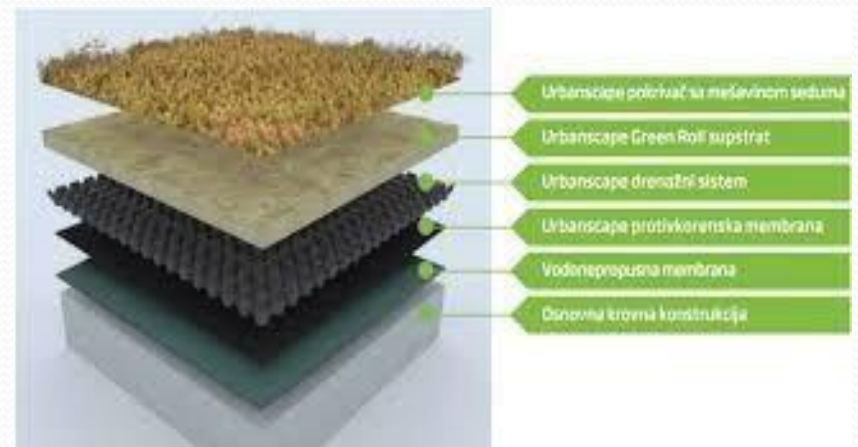
SEMI-INTENSIVE ECOLOGICAL ROOF

- Semi-intensive green roofs are a combination of intense and extensive green roof.
- These roofing gardens refer to the type of greening of roofs that users can physically access, and use them for various purposes, be it rest, recreation or even cultivation of vegetable species, aromatic herbs or flowers.
- They are created with the help of various types plants washed, but also some bushy species that do not have a branched root system.
- This type of roof garden requires maintenance every six months, and in some cases installation drainage and irrigation systems.



INTENSE GREEN ROOF

- An intense green roof is a system of greening roofs that includes the formation of an entire oasis of the roof garden, which you can use intensively and indefinitely for those purposes that you choose.
- Consequently, in order to realize this type of green roof, we take the initial stage of design and together we arrange with you the purposes and functions of your ecological green oasis.
- After that, we install the so-called irrigation and drainage systems that are necessary for the maintenance of the intense green roof.
- The selection of plant species is wide and applies to almost all plant species that would be planted even in your yard: from grass species, to washed, bushy species, and even various types of trees and flowers.





Green walls

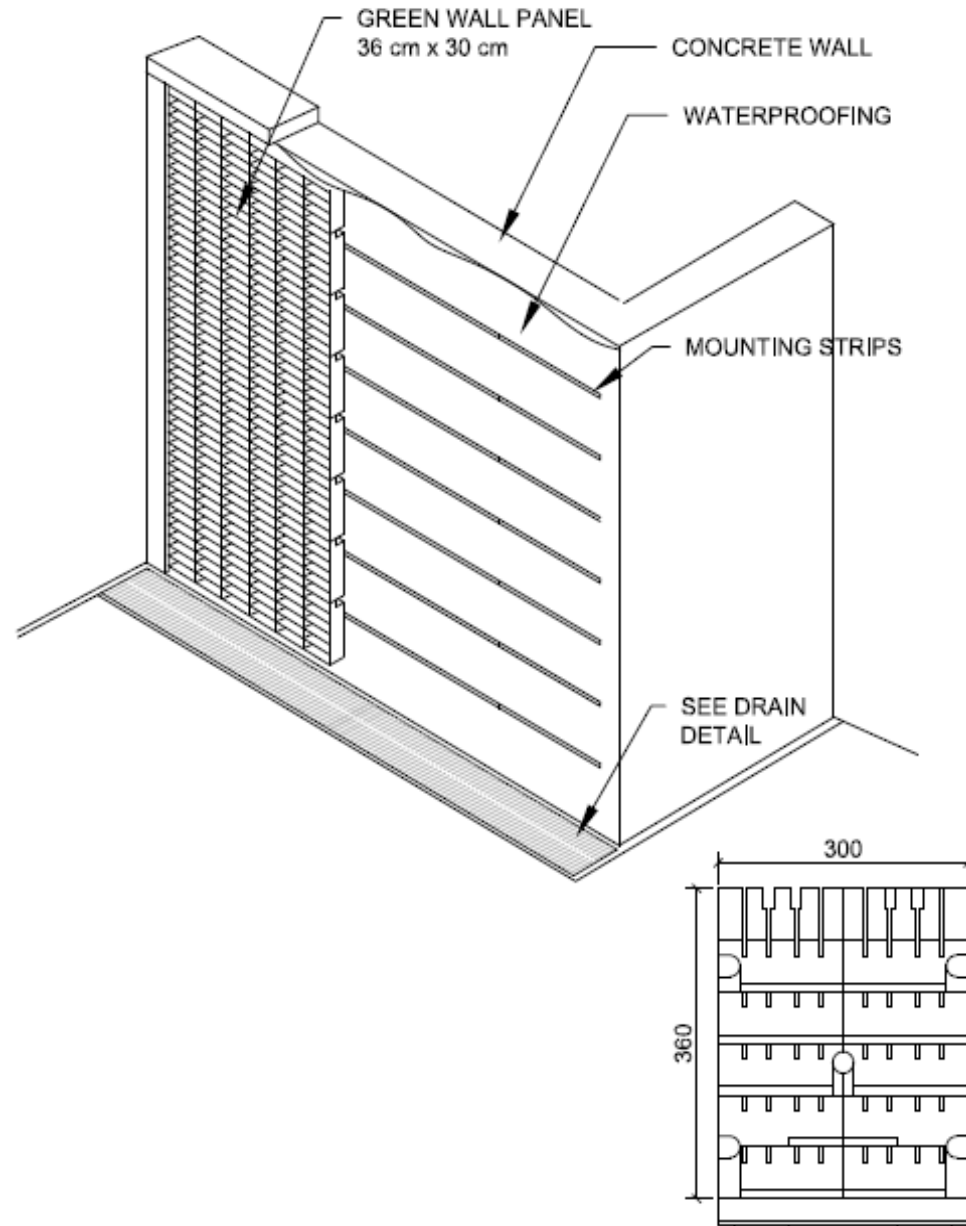


- Benefits of the green wall (developed plants)
- High aesthetic value,
- Quick and easy installation of module systems with developed plants,
- The design of the green wall can be easily modified even after installation,
- Minimum maintenance, Saving space and energy,
- Technical insulators in the summer and winter period,
- They retain and save water,
- Protect from the sun, wind gusts,
- Sound insulators and visual barriers,
- They purify the air and absorb harmful gases,
- They improve the microclimate by providing a more natural environment in an urban environment.

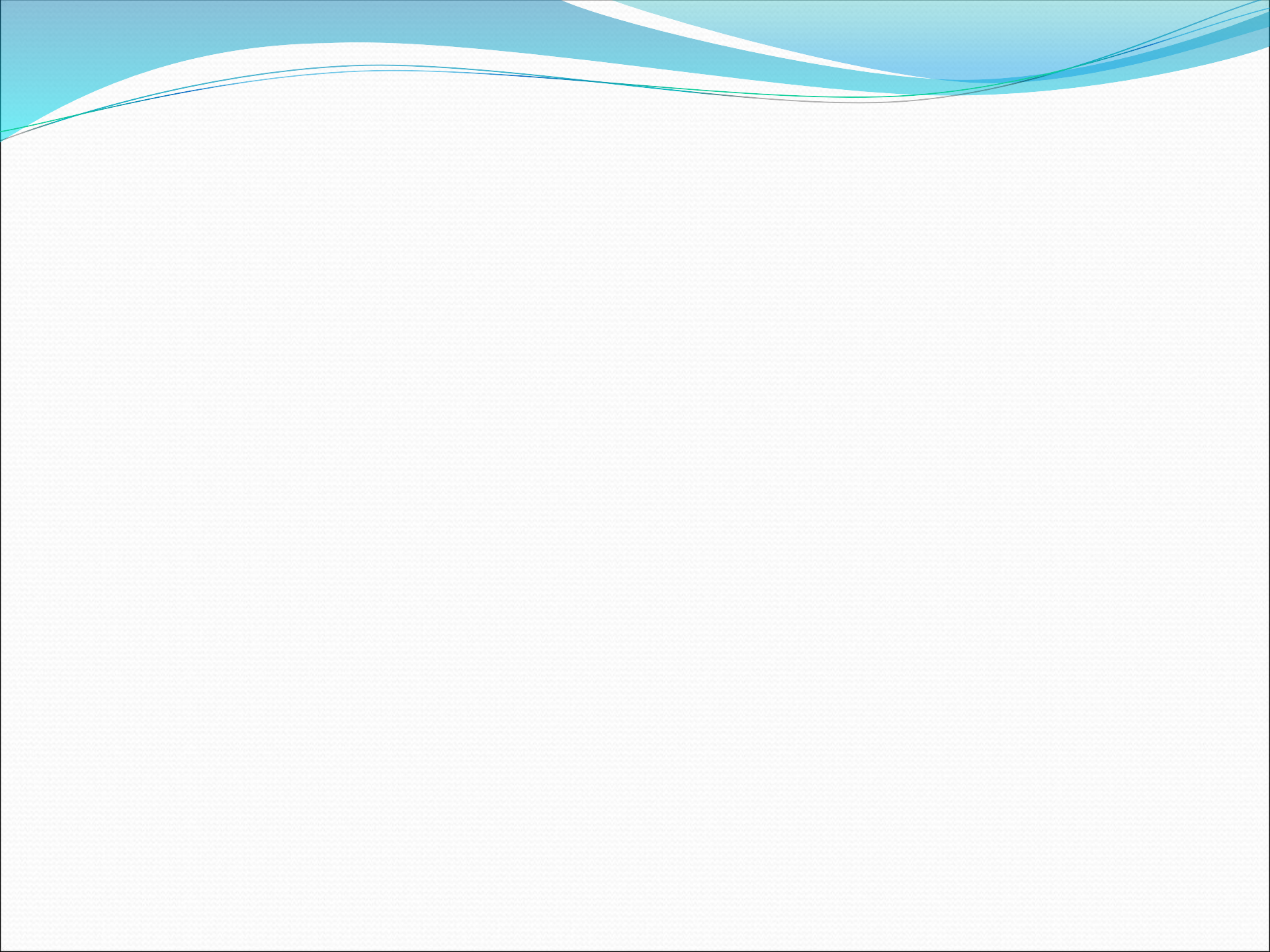


Application

- Ideal for small and large Surface
- For interior and exterior,
- A vivid picture of your logo,
- inscriptions, murals,
- In office spaces,
- Factory complexes,
- In catering facilities,
- On the new and old facades,
- As visual and sound
- Partitions
- In growing spices and aromatic herbs and vegetables







GREEN ROOFS

- A green roof is a great way to avoid using expensive tile to cover the roof.
- If it's good made, thermal insulation is on the outside of the house, and they are beautiful, because there may be a lawn, flower bed or vegetable garden on them.
- The orientation of the house with respect to the sides of the world allows the sun to penetrate the interior space to the maximum and hit some thermal mass, floors and walls, which accumulate heat.
- A green roof in winter prevents heat loss, and in summer it refreshes the living quarters.
- A green roof can also serve as a terrace, because its slope should be minimal, so large that water can flow away.



- A slope of only 0.5% is sufficient.
- Otherwise, the slope of green roofs should be no more than 40° due to erosion and preservation of the compactness of the green mass.
- But there are construction technologies on larger slopes as well, but they also cost money.
- Depending on the static of the facility, care should also be taken to on the weight of the green roof.
- There are those where the layer of earth is as thick as half a meter, to those with a very thin layer of earth.
- And gravel or bales of straw can be placed, from which over time the vegetation starts, first mushrooms, and then cereals from residual seeds in bales.
- Bales eventually string, so it remains an organic material suitable as an insulator.
- Straw is mainly used for roofing on outbuildings. Traditional green roofs in the Faroe Islands

Benefits of green roofs

- Green roofs have many advantages over ordinary roofs:
- act as thermal insulation, thereby reducing heating and cooling costs in the buildings under them by about 20%, then, prolong the life of the roof by protecting it ultraviolet radiation, major temperature changes and mechanical damage (e.g. hail).
- They also absorb sound and reduce the impact of noise, and filter the air and create a higher quality microclimate.
- In addition to the opportunities they have in saving energy, flat green roofs in urban environments can become oases of greenery, places for rest and relaxation at their fingertips, while providing habitat and shelter to various animal species.

Types of green roofs

- Green roofs used to be normal to see in the north Europe, where grass roofs were used, and in U.S.
- Prairie, where they were common practice on earthen houses.
- The green roof is essentially a roof on which certain suitable vegetation is planted.
- In recent decades, green roofs have been returning to small doors and increasingly becoming indispensable in projects of urban planners, builders and architects, primarily due to the possibility of alleviating extreme weather conditions.
- While summer temperatures on standard rooftops can reach up to 65°C, green roofs can cool nearby areas by about 16-17°C on average, placing them just behind street trees by effect, thus reducing the phenomenon of urban heat islands.

- Green roofs are divided into two main groups:
- extensive green roofs and
- intense green roofs.
- Intense green roofs in Manhattan



Extensive green roofs

- The purpose of an extensive roof garden is to have natural, light vegetation that requires minimal maintenance.
- Communities with herbs and drought-resistant sedums can also get along.
- The standard multi-layered design of the extensive roof garden is designed, which includes layers for various functions: a layer that allows growing vegetation, filtering and drainage.
- The layer that allows vegetation to grow is the substrate mineral composition and low organic content.
- The substrate must have the ability to retain water nutrients and provide enough space to the root of the plant.

- Excess water that plants cannot absorb should be reliably eliminated.
- The drainage layer, which contains the functions of accumulation and drainage, is also an integral part of this system.
- A filter layer is placed between the substrate and the drainage layer, which retains fine particles from substrate and therefore ensures that the drainage system continues its function.

The weight of a standard mineral substrate is approximately 10 to 13 kg/m² per cm of layer thickness in a state of water saturation.

For planting sedum, the thickness of the substrata is recommended at least 6 cm.

When vegetation, filter and drainage layer is included, the mass is approximately 70 to 100 kg/m².

Sedum or herbs with a substrate at least 8 cm thick due to the roots, can weigh from 90 to 130 kg/m²..

- The most important maintenance task is regularly weeding and fertilizing the substrate when necessary. Watering, at least with rooted extensive herbs, is not necessary.
- Only new herbs, in dry periods may require watering.
- Until the desired vegetation covers the desired surface of the roof after one or two seasons, a little more maintenance is required.
- After that, two maintenances and a visit to the roof per year are enough.
- Ideal would be in early spring and autumn



Green roof in France

Intense green roofs

- Intensive plants offer a wide range of design options, including creating a garden on the roof.
- Sun spaces can be created, and even trees can be planted.
- If the vegetation layer is deep enough and enough water and nutrients are provided, the conditions for plant growth on the roof can practically be as good as on earth.
- Planning an intensive green roof, especially the choice of suitable plants, requires the knowledge of specialists.
- Grasslands and low vegetation require at least 20 cm of substrate.
- Despite the large capacity of the substrate for water retention, intensive plants in general, and especially grasslands, must be watered regularly during dry periods.

- In gardens on the roof, as with any garden on the ground, there is a direct correlation between the quality of care and maintenance and the condition of the vegetation.
- Given the wide range of intensive planting options, it is recommended to establish an individual maintenance program.
- The maintenance required by intensive green roofs is significantly higher than with extensive green roofs.
- As a guideline for their maintenance can be considered maintenance that requires a comparable garden on the ground.
- The ideal slope of the roof is between 1° and 5° .
- Roof structures without slopes do not pose a problem for intensive roof gardens; extensive roof garden requires planning.
- For hair roofs with a slope above 5° , it is recommended to use planting systems for hair roofs, and can be built for inclinations up to 25°

Types of hydroponic systems

There are two types of hydroponic systems - some of which work hard, and some do not.

From the suspension it is known that it is boiled, that it is well drained and the water is boiled.

It is relatively sterile and inert (without nutrients).

It looks like a sandstone chaff, coconut shell, perlite, vermiculite, volcanic sand and dr.

Capillary hydroponics are the most reliable, passive noise.

The nutrient solution is pumped over the rocks from the tank.

There can be a lot of suppressed energy.

However, this hydroponic system is not for those who have a large amount of water and can use more water than they do.

That is why it is used with slow and long-growing e.g. of flower species in potted plants.



Water culture is the most reliable of active hydro cysts.

The priest watered the basin and on his plowing billboards on Styrofoam platforms.

Root is directly in the water.


The automatic pump pumps a small amount of water and pumps a small amount of water without having to worry about it.

The pump is empty and the floor is full of what is in the water.

It seems to us that we have all the more weavers about the storage of the container in the containers.

It is good to eat salads and vegetables that are brisket and full of water, but not to eat large vegetables with blood vegetables.

The flow and flow system (e.g., Ebb and Flow) is so that at different intervals it is exposed to the flow of energy and the flow of energy is absorbed into the source.



This method is normally performed with a pump that is used with a control unit. When the hour is up, the car is pumped into the open air.


Every time he cries out, his eyes are set on the sound of the trumpet.

So it was decided that this post should be placed at least once a day with large and high temperatures, temperatures and humidity and high temperature.

The main man of this system is the reliability of the suppressor and the control system.

When the water cycle is carried out in a way that is not easy to get rid of, so that the water can be broken.

If this is a problem, you can use a substrate that contains more water (vermiculite, coconut milk, chimney).



Drip system is the world's largest built-in hydropower system with substratum.

He came and went with us to the harvest of the field.

The nutrient salt solution is fed under an underwater pump to each plant separately with a small dropper (tube).

In the second system, there are several key components that can be used as a source of input.

The front of the system does not allow the keyboard to be closed.

The film or NFT technique was developed in the 70-year period in English and some of the most advanced hydroponic methods were developed.

We have a sprinkler with water and knives -there is no pump for water and a scrubber.

Water stalls and spores are protected by plastic cushions for water where rupees can be fitted with screws.



Aircraft offers the latest technology in hydroponics.

Similar is a technically hilarious film because it is like an extract for a rustic piece of gold.

All of them are thrown into the oven and the cup is put in a very thin layer of maggots.

It takes about a minute.


The crumbs were filled to the brim with such a large number of clusters. The current load is up to 50% in a standard oven with a substrate.

There are no airplanes for the first time.

So the aeroplane needs to be built on the ground as if it were standing on the ground.

The purpose of the aircraft is not to land on the surface of all the crossbars where the airplane crashes will be completely unintentional.

The aircraft system is clean and free from standard hydroponics.



Hydroponic production is an intensive form of agricultural production in soilless media.

Water media, mineral or organically completely substitute the soil as a productive habitat.

It is based on the fact that plants absorb nutrients like inorganic ions in water. In natural conditions, the soil acts as a "reservoir" of nutrients, but it is not crucial for plant growth.

When nutrients are added to the water by making a nutrient solution from which plants draw them, the soil is no longer necessary for plant growth and development. In this way it is possible to grow almost all plants.

Thus, in hydroponic systems, plants are grown on substrates that are inert and in which their own composition or composition of nutrient dissolver does not change.

The main function of the substrate is to create static conditions for fixing the root system, and therefore the plant itself.


In hydroponic production there are several systems of cultivation: cultivation in water melts - "aquaponica" cultivation in nutrient aerosols - "aeroponica" treatment of organophones or "organoponics" and others.



Green roofs in Greece and a
green roof in Ireland

Green roof in
Ireland



- 
- Urban agriculture is a type of urban land use in which fruits, vegetables, loaves are grown as well as products of animal origin.
 - It can also be described as micro to small-scale agriculture, which is individually motivated and is mainly managed by actors without agricultural training and short distribution chains, such as self-consumption, gift giving, processing and direct marketing.
 - In Germany, the most common forms of urban agriculture are:
 - Small private gardens and balconies,
 - community gardens and several of the city's agricultural Economies.
 - We distinguish between urban and per urban agriculture (suburban agriculture)
 - In the case of per urban farming, it is predominantly economically motivated, and their managers mainly organize production in several areas and have multi-skilledness than those engaged in urban agriculture.

UP Typology

- The diversity of urban agriculture initiatives has very different objectives related to typologies and urban development perspectives
- UP types are directed towards the UP actor category, trade objectives and product distribution level
- Typology consists of three ideal types (Survival, socio cultural objectives, commercial purposes) on three levels: Micro, meso, macro, and those further on subtypes and mixed
- Due to different development pathways, urban agriculture gains diversity (new actors and spectrum of activities).
- As a success factor is the expansion of activities, such as inclusion, educational work.
- A sustainable city needs all kinds of urban agriculture.

Razine podjele

Interesi

Akteri

Mikro

Egzistencija

Pojedinac, privatna kućanstva

Meso

Sozio-Kulturell

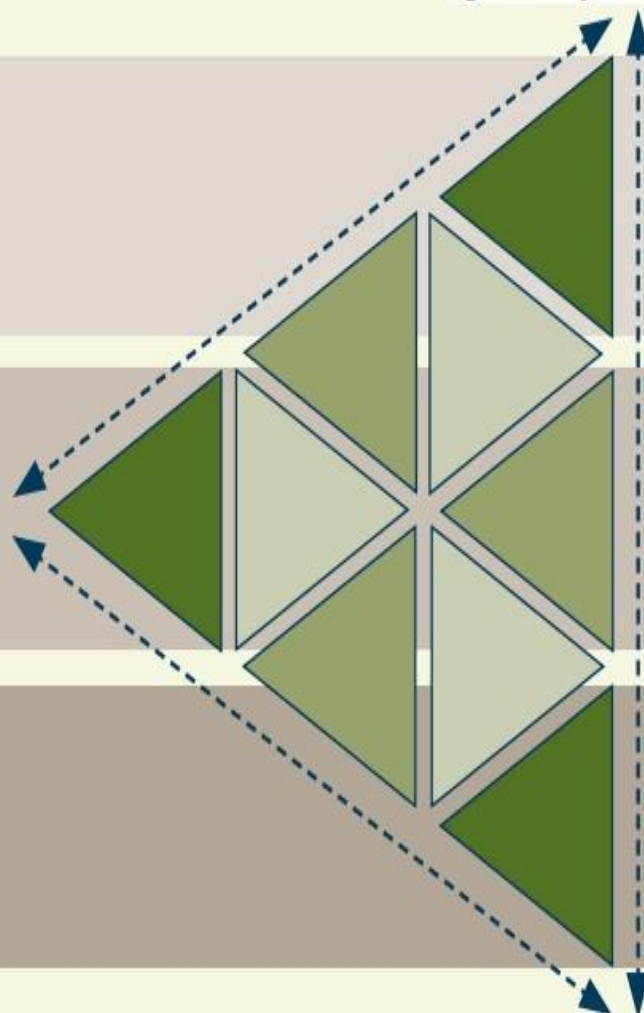
Udruge, Start-ups


Makro

Poduzetništvo

Kommerziell

▲ Idealtyp ▲ Subtyp ▲ Mischtyp



- 
- Existential orientation (self-sufficiency)
 - Goals: access to (organic) food savings on costs, health, recreation
actors: individuals, private households
 - Socio-cultural orientation
 - Goals: community life, education, cultural exchange, social inclusion, political motivation
actors: communities, associations, commercial orientation objectives such as revenue generation, job creation, new jobs
 - Markets, Profit actors: companies

Idealtypen



Subsistenz



Sozio - Kulturell



Kommerziell



Initiative

Hausgärten, Balkonbepflanzung

Schulgärten

Back to the
Pilzfarm (U)

Verteilung

Individuelle Nutzung;
Mikrolevel

Gemeinschaftliche
Nutzung; Mesolevel

Supermärkte
Makrolevel

Hauptziel der Initiative

Subsistenz; Nicht kommerziell

Bildung/kultureller Austausch;
Nicht kommerziell

Kommerziell

Akteure

Einzelpersonen;
Private Haushalte

Öffentliche Einrichtungen;
Vereine

Unternehmen

Subtypen



Subsistenz



Sozio-Kulturell



Kommerziell



Initiative

Initiative Kleingartenanlage
Kühler Grund, Berlin

Incredible edible
Todmorden (UK)

Germantown
Garden (USA)

Verteilung

Individuelle und. kollektive
Nutzung; Mikrolevel/Mesolevel

Lokal; Innerhalb von
Todmorden; Mesolevel

Bekannte
Konsumen

Hauptziel der Initiative

Subsistenz; Nicht kommerziell

lokale Nahrungsmittelsicherheit,
Nicht kommerziell

Kommerziell

Akteure

Verein

Nicht Regierungs-
Organisationen (NGO)

Unternehmen

Mischtypen



Nicht-Kommerziell



Nicht-Subsistenz



Nicht-Sozial



Initiative

Nachbarschaftsgarten
Ton Steine Gärten, Berlin

Verteilung

Individuelle Nutzung-Mikrolevel
Gemeinschaft-Mesolevel

Hauptziel der Initiative

Nicht-kommerziell

Akteure

Gemeinschaft/NGO

Prinzessinnengarten, Berlin

Beetpaten - Mesolevel;
Restaurantverkauf-Makrolevel

Kommerziell; Sozial-kulturell
Nicht kommerziell

Unternehmen

Meine Ernte
(Selbsternte)

Mitglieder-

Kommerziell

Unternehmen

Nachbarschafts-
garten Ton-Steine-
Gärten in Berlin

Beispiel für eine
kommerzielle Produktion
von Gemüse und Fischen
in der Rostlaube –
Containerfarm in Berlin









Wheat in a glass
dome for smoothies
(commercial)











Generationengarten Petulenkpark München



Tomaten, IKG Spessartweg



Greensgrow Farms in Philadelphia



Plastikflaschen im Garteneinsatz




Kürbis im IKG Steigerwaldweg in Hannover



Kräuterspirale





In view of the previous question arises "for whom is it produced?"

There are three levels to distinguish:

Microlevel: no further sales and distribution outside the products, his family and circle of friends

Meso level: products shared within a defined community (among friends and acquaintances)

Macro level: Products are divided within a specific group and consumers are not in any defined relationship with manufacturers

URBAN AGRICULTURE

- Cities, as environments where more than 50% of the world lives today population, around 70% in Europe, must meet their biological, environmental, social, economic, aesthetic, as well as other requirements and needs
- The urban population is increasingly focused on consumption, so urban development needs to be directed towards sustainability.
- Sustainable development of the city can be achieved if renewable energy systems, economic, humane, ecological and technological potentials are established.
- Cities create high social mobility, but equally, they can increase the gap between rich and poor citizens in terms of housing supply and housing in the city or the availability of education and social services.
- Social mobility affects political stability and trust in society, so if it is low may lead to a distortion of functionality.

URBAN AGRICULTURE

- Furthermore, efficient urban planning enables the coexistence of different groups located in the city (racial, ethical, religious, etc.) or social equality, which, if not effective, can cause even greater differences between the population and slow down the growth and development of the city.
- Finally, environmental sustainability is an essential condition for sustainable growth.
- The high density of residents in one place largely leads to the emergence of environmental problems such as water and air pollution, land destruction, the rapid spread of infectious diseases as well as natural disasters such as earthquakes, floods, etc.
- Therefore, the prospects for sustainable development of cities in the future will depend on effective planning for the future.

Sustainable development

- The first agricultural revolution (introduction of tillage, i.e. preparation of sowing layer, break of natural balance)
- Second agricultural revolution (use of sowing plow and introduction of crop rotation - the only balanced period in agriculture)
- The third agricultural revolution - the chemical revolution (the basis of modern agriculture - closely specialized production, high production with high input energy, on scientifically proven foundations, economically effective, minimal representation of human labor, but is risky to the environment).
- Fourth revolution in agriculture - sustainable agriculture



Sustainable development

Is a development strategy where socio-economic development does not threaten the natural balance, where current needs are met without compromising resources future generations



Sustainable Development/Subject Matter

Environmental integrity


Fairness among nations, individuals and generations

Economic efficiency

Ecological footprint

- Over a period of 40 years, humanity's pressure on the planet has become much greater than nature can be restored.
- We would need one and a half planets to create the resources necessary for immediate consumption.
- This means that we clear forests faster than trees manage to grow back, we consume drinking water faster than stocks can be replenished, we emit carbon dioxide (CO₂) faster than the natural processes of its storage in biomass or the sea.
- The consequences are multiple – reducing natural resource reserves and accumulating waste faster than it can be absorbed or recycled, as is the case with the growing amount of carbon dioxide in the atmosphere.

- The ecological footprint represents the sum of all the "environmental services" that people "require" from a particular space.
- It implies biologically arable land (or biocapacity) necessary for crops, pastures, populated areas, fishing and forest areas.
- It also implies here the area of the forest that is needed to absorb carbon dioxide emissions that have not been absorbed by the ocean.
- Both biocapacity, as well as the ecological footprint are expressed by a common unit called a global hectare.
- The main culprit behind this growing ecological footprint over the past fifty years is carbon dioxide emissions from the use of fossil fuels.
- In 1961, CO₂ emissions represented 36 percent of our environmental footprint, while in 2010 that number jumped to 53 percent.

- 
- Technological advances, the impact of agriculture and irrigation increased the average yield per hectare, which also led to an increase in biocapacity of 9.9 to 12 billion global hectares between 1961 and 2010.
 - During this period, however, the human population grew from 3.1 billion inhabitants to 7 billion, reducing biocapacity per capita from 3.2 to 1.7 global hectares.
 - Meanwhile, the ecological footprint of individual countries has grown from 2.5 to 2.7 gha per capita.
 - Given that the world's population will reach 9.6 billion inhabitants by 2050 and nearly 11 billion by 2100, biocapacity for every earth's inhabitant will decrease further, and it will be a real challenge to maintain biocapacity levels given the decrease in land quality, the scarcity of drinking water and increased energy costs.



37% of total Footprint:
31 OECD countries

including some of the richest economies



12% of total Footprint:
63 ASEAN & African Union
countries


including some of the poorest countries



Key

-  OECD
-  BRIC
-  African Union
-  ASEAN
-  Rest of the world

(For current list of member countries for each political grouping, please access respective websites.)

- 
- Concrete measures apply to those aimed at restoring the poor and neglected urban districts; sustainable urban development measures in thematic areas such as:
 - increasing competitiveness,
 - innovation employment physical restoration of urban areas and urban cores,
 - improving urban infrastructure such as transport and wastewater treatment, as well as housing conditions,
 - measures aimed at promoting more balanced,
 - polycentric development involving networking cities and connecting economically strong cities and other urban areas, small and medium-sized cities

2. Equality between nations, individuals and generations

- It is reflected in:
- meeting the basic needs of human society,
- improving the quality of life,
- education and employment,
- medical protection and public institutions,
- quality of accommodation,
- personal freedoms and decision
- making on all life issues.

2. equality between peoples, individuals and generations/issues

- Demography
- Access to waters
- Health care
- Education
- Malnutrition
- The position of women
- Freedom of expression
- Freedom of the press
- Social well-being
- Conflicts

3. Economic efficiency

- Optimal management of natural and financial resources for adequately meeting human needs with responsible companies and consumers with regard to goods and services arising, i.e. in accordance with government policy.

3. Economic efficiency/ questions

- Water consumption
- Energy production
- Sustainable agriculture
- Transport and communications
- Inequality
- Poverty
- Corruption
- Solidarity
- Economy



Sustainable agriculture/ properties

- Use of local natural resources (azote cycle, biological fixation of azotes, soil restoration, use of natural pest enemies)
- Application of byproducts of agriculture and other activities (e.g. use of garbage through recycling)

Sustainable agriculture/ properties

- Targeted reduced garbage production within its activities, creating interdependence with other economic activities, with the aim of increasing global efficiency
- Limits the use of agrochemicals and treatment procedures that degrade the soil and pollute the environment

Sustainable agriculture/ properties

- Protects the biodiversity and integrity of people and other living beings
- Acceptable to all; from manufacturer to consumer It improves the durability of ecosystems, fairly distributes riches respecting the environment.
- Endless resources are used in a prudent way and are the bearer of economic and social development
- Organize a farm on the principle of a sub-system open to all that works as a closed system

Lutte contre
l'érosion

Favorise l'abondance
des auxiliaires

Réserve de
vers de terre

Positive contribution to agriculture



Favorise la
reproduction du gibier

Améliore la diversité
végétale

Réduit les
pollutions diffuses

Contribution positive à la qualité de l'environnement

Positive environmental impact

Agricultural production (management systems)

- 1 Traditional agriculture (agrotechnics and varieties before intensive application of agrochemicals and newly created varieties)
- 2 Conventional - industrial ("green revolution"; yield, classical processing, intensive application of nutrients and pesticides, monoculture, GMOs...); Environmental protection?
- 3 Integral (economical production by more environmentally friendly methods)
- 4 Organic (eco, bio) – ecological production system,
- 5 protection of human health, environment and animal welfare
- 6 Biodynamic Sustainable agriculture ('low input quality food', 'low input sustainable agriculture')

