URBAN FARM AS A SYSTEM OF PRODUCTIVE URBAN GREEN – CHALLENGES AND RISKS

Justyna KLESZCZ *

*PhD Eng. Arch.; Faculty of Civil Engineering, Architecture and Environmental Engineering, University of Zielona Góra, ul. Szafrana 1, 65-516 Zielona Góra, Poland
E-mail address: j.kleszcz@aiu.uz.zgora.pl

Abstract
The main topic of the paper is an analysis of the urban farm system phenomenon as the action taken in cities in order to develop a new form of productive green areas. The main goal of the work is to compare solutions implemented in European cities such as Paris, Barcelona or Vienna, with solutions developed in non-European cities like New York, Brasilia or Hong Kong. These solutions differentiate between each other, according to the formulated taxonomy due to the scale, purpose and the role of urban agriculture in each of these examples. System analysis undertaken for the purpose of this study has given a number of common characteristics that determine the growing popularity of new forms of urban agriculture as the most modern city functions.

Comparing causes of the emergence, the implementation of different solutions and modifications resulting from functional analysis of the existing facilities is an important element for developing guidelines for the further development of urban agriculture systems, also in Poland.

Keywords: Urban agriculture; Urban farming, zoopolia; Urban food self-sufficiency; Productive urban green.

1. INTRODUCTION

The main purpose of the research is to analyze a future role of urban farming in modern urban design as one of the youngest and still most uninvestigated urban functions. At the same time, the analysis may serve as an indicator of methods and objectives that will be achieved by introducing urban agriculture in Poland as a legally and socially legitimised form of urban greenery and a branch of urban industry.
2. METHODOLOGY

The paper presents a method of case study analysis of cities in which urban agriculture was introduced as an initiative of municipal authorities or as a social one. The analysis shows examples of the cities of Western civilization as the most similar to Polish socio-political and climatic conditions as well as Western tradition and culture. Presented synthesis shows basic directions of developing urban agriculture as a green system with strictly defined purposes and achieved goals as well as negative effects on urban space that are to occur in the nearest future.

3. REDEFINING URBANISM – APPROACHING THE IDEA OF URBAN PRODUCTIVE LANDSCAPE

Attempts to introduce agrarian functions into cities and combine them with the typical urban production have been known since the end of the 19th century. Showing contemporary attempts to interpret the phenomenon of settlement in close relation with agricultural area as an opportunity to create a new quality of space for living – without obvious urban defects such as overcrowding, lack of open green spaces, or creating an urban lifestyle architecture has become one of the main contemporary trends in the theory of architecture.

The first ideas of combining urban and “non-urban” functions into a single entity that gained positive aspects from both sides have been discussed in Europe since the mid-nineteenth century, although the idyllic tradition of connecting cities and villages in the form of open landscapes combining the best of both elements is known from earlier historical periods. The Flemish landscape by Aalbert Cuyp from the mid-seventeenth century shows an idyllic cattle grazing landscape in the vicinity of Dordrecht, the background of which is created by the village surrounded by close, but safety nature. Significantly, views of grazing cows, ploughing, sowing and harvesting taking place in the context of urban landscape in the immediate vicinity of human settlements known from the works of nineteenth-century realists is now returning to the landscapes of Dutch cities as urban areas occupied by temporary vacat lands very close to dense urban development, recreating historical landscapes.

This modern arcade is of course not only a European vision. But while the proximity of productive landscapes in the form of a beautiful, opened view is pleasant to humans, because of creating an impression of having contact with nature, its proximity to the safe distance zone and the penetration of agricultural productive land directly into the built-up area starts causing fret.

Homo urbanus pursuit, basing on the definition of contemporary man by Jelle Reumer [1], [2], to create an environment that will reflect the need of contact with nature, has brought into life, in a highly modified form the idea of sentimental relation between human and nature in the democratic form, accessible for all of the inhabitants the modern vision of Ebenezer Howard’s garden – city idea. This framework will not arise, however, as a solution to nodal elements, but as an idea of transforming entire urban structures. The urban farm in Brussels, where local cows graze on the background of both contemporary and historic architecture, is no longer just a sentimental vision of modern Arcady, but is becoming a form of living image and reality in urban and suburban areas [3].

This is related to the formation of the urban productivity concept based on agriculture. The concept of the role of productive urban and peri-urban landscapes presented by Undine Giseke in 2015 [4] distinguishes the division of urban agriculture due to its morphology into nine individual types of landscape, characterized by a different structure of the agricultural part and the type of relationship that takes place between its three main parts: urban landscape – cultivated areas – open and landscape. In this case urban productive green is divided into morphologically different types. Different concept defines the idea of productive urban landscape as “(…) an open urban space planted and managed in such a way as to be environmentally and economically productive, for example, providing food from urban agriculture, pollution absorption, the cooling effect of trees or increased biodiversity from wildlife corridors”. [5].

Referring to this solution, the concept of Continuous Productive Urban Landscapes (CPUUs) was published, showing the role of coherently planned and designed combination of different urban elements, compering economical, socio-cultural and environmental terms, re-establishing a relationship between life and the processes required to support it. In last few years several more key texts provided overview related to the advocacy of urban agriculture as a form of urban landscape planning, this includes Hodgson et al. [6] or Napawan [7]. This last concept, basing mainly on American Planning Association typology gives a wide perception on spot-like forms of land-
scape, different from linear concepts of Bohn and Viljoen [8]. Many of these concepts show close relationship (functional and morphological) between urban green with its different typologies and urban farming, as one of the forms of greenery [9] and despite many formal differences, basing on case study analysis presented in the article urban agriculture can be perceived as urban green on equal rights considering also its accessibility.

The example of Israel city of Beersheva shows the problem of dual nature of man’s relationship with natural landscape in the modern city. (Figure 1) On the one hand, the relation is connected with realizing the need for close contact with nature, and on the other – the fear of staying in too close interaction with the thing unknown and out of control. This phenomenon, which occurs in psychology, was described in relation to the way of spatial planning of the city at the beginning of the 21st century by Richard Louv, basing on the work of Jennifer Wolch [10]. Defined in the book “Last Child in the Woods” [11], the notion of a nature deficit disorder has identified a syndrome of psychosocial disorders associated with lack of contact with nature. As Louv proved, renewing people’s contact with nature is fundamental to physical, mental and spiritual health. He pointed out that when we take children into the forest, symptoms of attention deficit hyperactivity disorder weaken, and the interaction with nature strengthens immunity, sharpens senses and intelligence, improves physical and mental health and affects social relationships. Comparing these claims with the current method of town planning encourages the possibility of denying the notion that it is necessary to separate the “city” from “nature”, understood as all manifestations of non-urban functions in urban areas.

Therefore, the connection between reflections on the need of redefining the modern city by changing relations with its “humanized” nature, understood not only as urban agriculture, but also as the presence of nature and urban wildlife seems to be important. Besides, it is logical to assume that in food production areas, often treated as an alternative form of urban greens, wildlife will occur more frequently, due to greater security and a much greater chance of gaining food.

It is true that as yet one of the main problems of Polish cities is precisely this “excess” of wildlife in the form of deer, wild boars and foxes treated as an intruder and a great threat. But at the same time this state of the human mentality towards wildlife is slowly changing [12], [13].

This is not only a Polish problem, although in Poland only recently public discussion on the subject had begun. Just a decade earlier, Jennifer Wolch described the issue affecting many American cities with their sprawling suburbs and the growing problem of “biologically sterile” and international natural urban environments, where people do not cope in any form of contact with wildlife. It describes, however, a potential scenario for developing modern cities, that is attempting to resolve the situation in an unequivocal way by moving from biologically sterile environment and limiting the absorption of natural resources from the space surrounding urbanized zones [14]. This was the way of introducing the term of zoopolia [10] as a form of urban development rebuilt into a wilderness habitat, thanks to planning, architectural and educational activities. Urban greenery in this idea is a habitat of wildlife and primitive, characteristic for the given area species, creating ecological corridors that allow the safe movement of animals within the city borders. The process that is currently being promoted, supported by human activity or spontaneous, has been called the enchantment of
the city [11]. Although this concept appeared in Wolch’s work under the philosophy of animal rights animal liberation movement [15] or in broader aspect of eco – philosophy, it is based on the form of reversal determinism, which is to compensate for the former injustice and harm caused to animals by human, rejecting the right to live without suffering. Consequently, the beneficiaries of the city thus restored would be the animals themselves. However, this issue is actually more complex. Some time ago the theorem on the lack of continuity between man and animals was debated, overthrowing the anthropocentric and androcentric foundations of modern knowledge and creativity, also architectural and urban.

This process is directly related to creating productive urban green systems in the form of publicly accessible, semi-public or private urban farms as a complement to the urban structure. Places of this type are already present not only as a space serving people and meeting their needs, but also opened to urban animals. Open spaces are often visited by wild species as a source of safe and readily available food, and some of them had been already planned in this way.

An example of temporary container QHaven urban farm (2014) at the Iceberg estate in Aarhus (2013), Incredible Edible at Folie P6 in Park de la Villette in Paris (2008) show opportunities offered by urban farming for programmatic and systematic improvement of the quality of urban space as wildlife habitat in the city.

The end of the nineteenth century brought the emergence of a new idea of garden – city, created by further mentioned Ebenezer Howard [16], based on transforming cities in a way providing housing estates broad access to the surrounding greenery and closeness of jobs. It was a time when humans were still coexisting with animals in developed areas. One of the less known examples is a small flock of sheep living in the Washington Capitol for maintaining urban green on the Capitol’s hills. At the same time, however, Londoners of the early twentieth century hoped to welcome the arrival of automobiles as a solution to the problem of polluting of the city by horse dung [17]. However, the story goes on. Currently recognized as the most progressive in terms of pro-social solutions, countries such as Sweden, Denmark and the Netherlands are returning to keeping small urban flocks of sheep together with the necessary facilities for having almost costless care of urban public greenery, like in the example of the city of Almere. Realization of the vision of returning to the balance of urban environment through realizing the premises demanded by Howard can be found in the project of settlements such as EVA-Lanxmeer in Culemborg (1994-2009), which was integrated into the Caetshage farm project [18], [19], producing fresh food products for local trade, gastronomy and additional income earned in the housing estate. The low but intensive development of the complex combined with the use of number of elements related to the reduction of environmental impact of the settlement, basing on eco-village of sustainable development concept and the use of typical forms of old farm buildings has made it possible to create a living – sentimental vision, however, encapsulated in a kind of safe sheath, buffer zone separating the inhabitants of EVA-Lanxmeer from contact with wildlife “unfiltered” by the urban agricultural production zone.

Another variant of similar solution was also obtained in the Netherlands, creating the first roof farm in the country, Dakker on the roof of Schieblok, Rotterdam (2012). In this case, the buffer space was created by placing the orchard at altitude. This type of solution, however, is not as might be expected, an island or point solution. In the case of Dakker as well as other cultivars, the link between urban green areas is associated with cultivation of honeybees, which play an important role in shaping urban ecosystem, in this case – Rotterdam [20].

The mosaic structure of residential or post-industrial areas adapted to the needs of urban agriculture along with green spaces of the crop, creating an open urban – rural landscape in Geneva, Hamburg, Esslingen, Barcelona and other European cities is the result of applying productive green as an immediate action in urban space. Its interventional role, both for the form of created landscape and the quality of life of its inhabitants is being in this case more often strengthened [21].

An important element of what will constitute human acceptance of the form that creates urban agriculture in city scale and degree of perception and landscape division into functional forms different from buildings is, in this case, the case analysis of urban landscape farming systems in the particular city. It may be presumed that an important element that demonstrates the landscaping potential of urban agriculture is creating elements differential in their architectural and structural form, but unified by the inseparable presence of urban green. Udine Giseke defined in 2015 nine morphological types defining urban-rural landscape on the example of Casablanca created by introducing agriculture as a method of comprehen-
sive approach towards urban green structures [4]. They determine appearance of individual elements of city changing under the influence of introducing new features. These include Precise Urban Agriculture, Beautiful Productive Greenbelt, Parasitic Backpack Agriculture, Rurban Stripes, Rurban Microfabrics, Country Town, Agroforopolis, Beautiful Productive Landscapes and Hyper-productive Rural Landscapes.

But how does this affect the appearance of modern metropolises? Let’s try to analyze the directions of development of modern forms of urban agriculture occurring in cities in different parts of the world.

4. NEW YORK CASE STUDY VERSUS AN AMERICAN THEORETICAL MODEL OF URBAN FARMING

In 1909, a drawing of Artur G. Walker’s 1907 Theorem was published in “Life” magazine, showing the vision of a Manhattan skyscraper – a farm in which separate platforms were set up as traditional American farms with accompanying farmland. This solution preceded creating two of the utopian ideas of transforming American urbanism and adapting it to changing vision and the rhythm of everyday life, growing mobility of individuals, and dynamics of changes in housing needs.

The first utopia was presented by Frank Lloyd Wright in the idea of Broadacre City, published in The Disappearing City in 1932 [22]. Broadacre was not only a vision of the city as its antithesis and apotheosis of the phenomenon, symbolized by emerging American suburbs. Just as in the case of Letchworth, based on Howardian garden – city concept, it was also to be realized in 1947–1951 in a deformed form of a village Levittown, New York, as the first suburban estate produced massively. Just a little later, in 1944, the second major idea of transforming American cities into productive agricultural land was published by Ludwig Hilbesheimer as The City in the Landscape, published in 1944 [23], which in 1949 became a basis of The New Regional Pattern. Industries And Gardens, Workshops And Farms with a vision of city based on a low-intensity urban structure connected with differently defined areas of productive greenery.

These two ideas have legitimized the phenomenon of American cities spill over and the restriction of typical recreational urban green areas. However, American cities suffer from another problem, due to population growth and deterioration of living conditions. This is also due to the deterioration in the quality of urban infrastructure in the strict centre, in downtown areas with high density urbanization, which in American conditions were often high-rise buildings. In response to the problem of overcrowding, ugliness and progressive urban sprawl James Wines and SITE (Sculpture in the Environment, founded by James Wines in 1970, located in the New York City) created the utopian project of High Rise of Homes (1981). Described by designers as a vertical community [24], had a task to combine antagonistic needs of city dwellers to their need of cultural attractions of the downtown area without sacrificing individualistic and atavistic need for ownership, embodied in a form of private home with a garden, suitable for suburbs and rural areas with their complement of productive greenery.

These visions have become the source and the best summary of problems to be faced with in modern American cities. Nowadays they are being accomplished in the New York city. This is one of the reasons why the city already has several independent research and development teams redesigning it to achieve at least partial independence from external food supplies at the expense of transforming characteristic and for most people – symbolic urban structures of the agglomeration. The form of green imprinting in the New York City appeared much earlier than the first ideas for multifunctional urban farming. The first step in the direction of the revolution in systematic approach towards design of modern urban green areas was made by the time of building the Ford Foundation headquarters in 1968 by Kevin Roche, John Dinkeloo Associates [25], with an amphitheatrically shaped garden forming the main internal entrance area of the office building. Although the garden is not yet arable, but a recreational space and a form of representative entry, the potential of this solution has contributed to the formation of a new consciousness in office building design, opening the way for more revolutionary solutions.

5. THE NEW YORK CITY CASE STUDY

An idea of self-sufficient and self-reliant New York is a vision of how to transform most parts of the city based on its future production capabilities. Over the past 10 years, a number of proposals have been made based on trying to transform the most degraded spots – part of the city with the most difficult access to fresh
food or the smallest proportion of urban green, using a new idea of urban design – urban farming. An exception to this is the island of Manhattan, considered in each case as the basis for further development of urban vertical farming or other forms of urban agriculture, which, despite the enormous intensity of development and overcrowding, also has a large share of greenery in district structure through the presence of Central Park, as the largest concentration of park-like space.

System based on redistribution of food inside of the city was the first of the New York City (Steady) State guidelines, formed by Michael Sorkin, Terreform Research Group [26]. The concept of strong political foundations relating to the growing incompetence of nation states and predatory organizations of international character has given rise to the idea of local self-reliance, which allows small, in global approach, areas to become independent from world economies at least in terms of assuring the inhabitants of their basic needs [26] and creating a sustainable space through energy and nutrition self-sufficiency within their borders. The reversal of Manhattan’s typical quarter-building scheme and negatives of the old urban layout with street-side buildings and green productive plots inside empty quarters allowed to create a new type of urban space – a negative structure. By reversing the function from urban to non-urban, the system also reverses the structure of development, thus creating an urban accent emphasizing the difference of function in a given place. The solution proposed for Manhattan itself, as the central point of the city, was to create a planar system for urban agriculture by supplementing existing structure with various forms of agricultural production: sealing, green roofs with agricultural functions and, where possible, green productive facades.

In similar form, yet completely spontaneously urban farms already arise in areas where intensity of population and development is even greater than in the case of New York. Example of farms on rooftops of skyscrapers in Hong Kong proves the effectiveness of
this form of urban greenery systems created spontaneously by residents themselves in places, where the value of land is too big to leave space for urban greenery in the traditional form.

Another system approach to the problem of deficiency of urban green and access to fresh food was presented by the WORK architecture company project group in 2011. The research conducted for New York – Brooklyn area in Bushwick and Bedford-Stuyvesant districts show a significant problem of the lack of readily available distribution of fresh, unprocessed food and the reason for its high prices, resulting from very large radius of delivery, exceeding 100–200 miles [27].

Therefore, a proposal was made, that not only complemented the imposition of elements on already existing urban structure, resulting in its functional densification, but a solution which introduced significant sanctions in existing housing development in order to develop a new quality of the urban productive space. The four main assumptions included the redevelopment of urban transport by significant elimination of private road transport to transform it into integrated system of over-the-street traffic and collision-free public transport, which would also allow to convert some of the arteries into street farms basing on orthogonal grids, ensuring continuity of ecological corridors thus created. A simultaneous combination of ground – based traditional street farming with aquaponics, including underground fish farming and greenhouse cultivation has been established. Nodes of such network were to be strengthened by introducing a hierarchical layout of evenly distributed fairs or distribution centers and small points of food supply for each quarter.

The third type of system solution proposed for New York, but also for other American cities, such as Chicago or Boston, is to leave existing urban tissue unchanged and complement it by creating large, multifunctional facilities combining cropping and farming functions with various forms of housing and office buildings. Examples of such objects as Harvest Green Project (2011) [28], Self-Sufficient Skyscraper by Terreform (2010) [29] or Chicken Meat Production Tower by Terreform (2014) [23], Dragonfly by Vincent Callebaut (2009) and Plug-Out by WORK ac (2009) [31] show a very high functional and programmatic convergence despite different stylistic concepts and formal design. Creating a building – icon may in this case become a catalyst for further changes in the city space, although as you might think – will not cause a significant increase in food self-sufficiency of the metropolis.

The ideas of Hilbesheimer and Wright, which resulted in sanctioning the suburban structure of American cities, have now contributed to the need to address the problem of their structure spillover. Analysis of possible solutions was summarized in 2012 by the exhibition entitled Foreclosed: Re-Housing the American Dream organized under the auspices of the Museum of Modern Art in New York. WORK AC’s Nature-City project was based on a 225-acre plot of land at Keizer Station, Oregon at the end of urban structure of the city, separated from the main part by highway [32]. Design proposal for the final project envisaged creating a new settlement typology consisting of 15 types of housing combining residential and cultivating functions in different variants adapted to the type of local conditions, from community gardens, through private greenhouses on roofs to externally managed crops, outside of the given settlement unit.

The interdisciplinary nature of the design process to create a new social model of reorganized, self-sufficient city has led to forming the need for close collaboration between architects, urban designers and representatives of disciplines not specifically associated with urban space development. An example of a team working on the Nature-City concept shows the breadth of analyzed issues. The cooperation covered a group of lawyers, planners, environmental engineers, installers specializing in urban engineering, economists and ecologists, as representatives, for example for the exhibition Foreclosed.

6. EUROPEAN SOLUTIONS – EXAMPLES OF PARIS, VIENNA AND BARCELONA

New York’s case analysis shows growing scale of the problem. But do European cities suffer from the same disease that is nowadays a plague of American urban areas? The analysis shows that while the scale of problem is quite different, cities in Europe are also introducing system solutions to disseminate different forms of agricultural green areas in cities. By the same time their purpose is somewhat different.

6.1. Paris case study

The Parisian Main Verte program, launched in 2003 as an official action supported by the city council, envisaged reconstruction of green system in Paris by developing productive green areas in the form of social gardens and other agricultural forms. Managed
by local communities and associations, they are at the same time a solution, but so far only of a few significant problems afflicting the city. The program refers to shape of Parisian greenery, that is a form of green perpend outgoing of the two major forest complexes of the city- Bois de Vincennes and Bois de Boulogne, located on the axis of northwest – southeast. It marks the main axis of development of conventional greenery in the city. The Paris urban farm system is most closely linked to Eugène Hénard’s plan to create a point-to-point green park solution for the city, but in a partially publicized form. These include: lack of public greenery, which forms a network of ecological and climatic corridors in the city center; the need to create an alternative to large-scale recreational areas; arrangement of degraded and urban wasteland or vacant areas, especially in neighborhoods threatened by social pathologies and the increasingly important problem of social inclusion in the most multicultural urban areas.

Paris’s urban farms are mostly permanent, open community gardens, temporary or container farms located in parks or other green areas, parklets or green roofs, etc. The accepted model of co-operation is location of gardens in urban areas and, less often private ones, owned by local communities. It covers the provision of professional horticultural services, soil replacement, water supply and garden tool rooms. These gardens are to be opened to public in a certain minimum time according to a given time schedule and whenever the local gardeners are present. In the case of typical community gardens their surface area is in the range of 120–350 sqm. The layout of Parisian urban farms after more than 14 years of existence shows the role of these parts of the city in addition to deficiencies in the green system of the city. Main Verte assumptions are intensely developed from the north and south of the city, in areas farthest away from the already mentioned Paris urban forests. This greenery is also becoming a representative feature, which can be found in La Defense suburban area, where the L’Espanade subway station for la Defense, which is also the entrance zone to the office district, was created by the winery Le Clos de Chantecoq [33], a farm with strong historical background of being a part of Paris suburbs in the early 20th century.

Spatial analysis of the point distribution of urban agriculture occurring in any form within the administrative boundaries of the city allowed to define zones of intense development in a system perpendicular to the main axis of urban green development. It takes the form of a double wedge that extends towards the outlying districts. The smallest number of points can be found in the central part of the city and directly on the east-west axis. Due to the lack of central planning of farming system in the city, their arrangement depends only on social needs and number of local initiatives, as well as the number of available urban wasteland or vacant lots in the area. This arrangement is also related to the existence of more ethnic and cultural diversity in the area among population and population with lower social status. At the same time, urban farms in Paris are created without linking with green areas, in places with lowest percentage of public greenery. In this situation, it is possible to conclude that the complementary role of urban agriculture, which in this case complements the layout of public recreational greenery, in turn fulfils assumptions of the Main Verte program on the widest possible availability of established arable gardens.

What is important, in Paris there is no conventional farmland within the city borders. This ties in with the artificially limited boundaries of the city to its historic centre. In fact, the city is much more developed and creates the agglomeration of Paris, but areas which are functionally and compositionally related to the city are treated as separate municipalities, and are therefore not included in the Main Verte policy.

6.2. Barcelona case study

A different model of development of urban agriculture was adopted in the area of Barcelona. A large metropolitan area, like Paris, but with much less uniform, compact structure, Barcelona in the urban development of agriculture reversed the Parisian model. Instead of developing small farmlands in the central part of the city, a program was created to protect urban agrarian landscape in order to prevent urban farmsteads from being caught up into progressing urbanization of the suburbs of Barcelona since 1998. As a result, the city has a number of large, compact farmlands and three so-called agrarian parks [34], which are also important recreational areas for the city, as well as a well-developed network of local food redistribution centres and alternative forms of access, such as food boxes giving access to food directly from the producer and others. Examples of agricultural parks include the Baix Llobregad Agricultural Park, the Gallegos Agricultural Park, the Sabadell Agricultural Park. The example of The Baix Llobregad Agricultural Park illustrates the complexity of spatial dependencies, which are based on the concept of a cultural park that associates mainly 621 family-based farms,
which has evolved from the area of food exporting outside Spain into a region producing mainly for the local market of Barcelona. It is estimated that over 75% of the production is consumed locally [35].

6.3. Vienna case study

The Viennese urban farming development model is based primarily on creating small social gardens and temporary vertical or container farms in order to develop a network of urban agriculture in a similar way to the Parisian model. Although being based on a form of social aid, the Urban Gardening Project is less formal and not so often used for city advertising, though it is worth mentioning that City Farm Schönbrunn is the first and mainly educational farm in the city and the first experimental urban garden Karlsgarten was opened in 2016 in the historical city centre.

The theoretical solutions proposed for suburban areas of Vienna assume creating, as in a project awarded in the competition Project Entry 2014 Europe – The Commons: Participatory urban neigh-
bourhood, Vienna, Austria for the development of housing for community-based society in which the participatory mechanisms also refer to the self-sufficiency of the settlement while preserving the densely developed structure of the traditional Viennese suburban districts.

Yet the structure of urban agriculture in Vienna is based on similar elements as in the case of Paris the scheme of urban farms shows much greater concentration of points around the city centre and much more formal diversification, adapting the form of cultivation to the occupied area. Similarly, the reference axis is created by arranging large areas of park-and-forest greenery, in this case directly connected to large forest complexes on the west side of the city and the greenbelt along the river bank of Donau. Likewise, urban agriculture is concentrated in areas with the least amount of greenery. At the same time, however, it is interesting to note that some of the Urban Gardening Project Vienna’s modern urban farms are located at the boundary of conventional crops that occupy compact areas on the north-east and south side of the city, complementing the ring of the natural landscape.

Viennese urban farming is characterized by great diversity while using farming forms well-known from Poland such as cooperative allotment gardens transformed into community ones. The example of Mintzgarten by Ernst Melchior-Gasse from 2013 illustrates the possibility of using the smallest pieces of land as a part of the urban greenery divided into socially-cultivated quarters [36]. The whole area of about 200 sqm is divided into 14 plots. The characteristic feature of Viennese urban crops is the use of wasteland or urban brownfields as in case of the Karl-Marx-Hof Garten, located in the buffer zone of railway line, dating back to 1986. The plot of very elongated shape occupies an area of about 1000 sqm and is divided into 22 lots with ownership and typical form of allotment gardens with small garden arbors. Ökoparzellen dating back also to 1986 and located in suburban area near the city border, has an area of 21000 sqm and is divided into plant beds in a layout of about 80 sqm each. The garden regulations do not allow any form of buildings on the site and the form of garden resembles the most typical micro-scale agriculture.
7. SUMMARY

In addition to number of positive aspects connected with system of urban farming, in the case of systematic approach towards forming productive urban landscape, there is also a number of negative spatial events that occur in case of inappropriate approaches to design of urban agriculture. With development and consolidation, also in the Polish context, the concept of multifunctionality of particular urban zones is increasingly emerging in the problem of functional overinvestment as one of the manifestations of inertia in urban planning. It is thought that the systemic introduction of urban agriculture into structures of well-functioning, relatively small housing complexes is a form of manifesting the phenomenon of horror vacui of contemporary urbanism, where the fear of incomplete use of space potential can contribute to its excessive investment and thus actually declining space productivity.

Similarly, the lack of any developed formal tradition of designing space for urban farming, led to receiving form of industrial architecture, high-tech solutions, but also vernacular, rustic, ecological or historical forms of architecture. This leads to deepening of chaos in cities that introduce elements of agriculture. So far, it is difficult to determine the coherent stylistic features of created solutions, which does not conduct the positive identification of urban agriculture by inhabitants. The spontaneity of spatial forms and ways in which cities are locally transformed to meet current social requirements, without well documented, planned and fully coordinated activity, only deepens this state of affairs, causing lack of further systemic transformation of a form of closed urban area into an open system. This is also about the possibility of blurring the border between urbanized spaces and the outer natural environment by spontaneously mixing urban and agri-urban structures with rural areas into homogeneous tissue without clearly defined boundaries. At the same time, however, these examples point out number of elements of positive impact that urban agriculture has on forming healthy working and housing environment in conditions of growing cities. In the present situation the social role of shaping productive urban green is unimaginable.

Consequently, the main challenge of introducing productive urban green as a system solution is to choose the type of system – point or zone one depending on the structure of given city and links to its existing green system.

Apart from the spatial aspect that is the main theme of this paper, there are a number of additional factors that have a significant impact on the future system approach towards urban agriculture. These include social, geo-morphological, sanitary and cultural factors, which take account of both barriers and development motivators. Bohn & Viljoen claims, that one of the major obstacles to the introduction of systemic urban agriculture into cities is the potential soil contamination of sites reclaimed from uses such as brownfields, railway embankments, carparks or roads, as well as air pollution while redeveloping green roofs and others [37], dividing these potential obstacles into three main categories, that is regulatory, economic and technical [5]. Careful planning is necessary, as well as solutions which isolate food growing from the soil, either permanently or during the decontamination process. Therefore, special attention should be paid to the possibility of applying solutions that minimize potential threats such as growing in raised beds, applying selected crop and species, soil replacement, build-in agriculture with fully controlled farming conditions or reducing contamination of toxins through planting [38].

Utilizing the potential of urban agriculture in European context to complement and balance public urban green and to develop and complement urban landscape with visually appealing elements of agrarian production will be crucial to encroaching level of acceptance of this type of urban development. Instead of fighting the blurry of socially established forms of landscape in European cities, urban agriculture creates an opportunity to develop new, hybrid form of urban landscape based on combination of the best features of city and countryside to create a friendly urban landscape. Urban agriculture will function as a systemic solution in cities only while creating a system of production and redistribution of food in order to shorten the way to direct consumer. Then the value of reducing negative impact on environment will be greatest because it will integrate measures to increase the city’s biomass, as well as to reduce energy consumption, fossil fuels and eliminate unnecessary transportation within the urban fabric itself.

In Poland an important element for development of urban agriculture is to create its positive image in relation with or uninfluenced, depending on the type of subjective social feelings towards the problem, to existing arrangements of traditional allotment gardens, well developed and fixed in social image of the city. Nevertheless, an important element will be to ensure the city – wide coordination of build farms to
create an unambiguous system for identifying the idea in metropolitan areas.

8. CONCLUSIONS

By analysing examples of European cities, introducing systematic and recognizable solutions for urban agriculture, it should not be forgotten that the change had begun with spontaneous solutions, developed locally in cities, as realization of certain social needs – contact with nature, active forms of recreation which can become an additional source of income, a cause of commercial areas reorganization, etc. Comparing the scale of problems human encounter in Poland and in the world, the Polish initial conditions for creating systemic urban farming are much closer to Viennese solutions than those known from Paris or Barcelona. The similar structure of greenery, with small squares, parks, riverside areas, but above all allotment and social gardens created on similar to Polish conditions, which fluently evolved into form of easily accessible semi-public green spaces, gave rise to the analysis of Viennese structure itself as possible to introduce in Poland.

The New York case study seems completely separate. The specific social problems that are part of the city's role as a center of economics, business, politics, culture and science, but also a formerly very important sea port and now a world-class transit hub, causes a rapid stratification of problems known in much more limited scale in most of the world. Urban sprawl leaving the city far beyond its administrative boundaries and creating significant suburban areas causes a real lack of ability to provide fresh and cheap food to the city centre. Lack of facilities which would, in other circumstances, fulfil rural areas in the ring surrounding urban space results in creating even startling ventures to improve the quality of life of inhabitants of metropolis, especially if the problem is caused by lack of ability to fulfil basic life needs such as access to food, clean water and air.

The system analysis conducted for this study has led to identifying a number of common characteristics that determine the growing popularity of new forms of agriculture as the most modern urban function. However, like any other new form of urban development, without a well-developed formal tradition, it requires careful refinement of initial assumptions in order to consciously and not merely spontaneously and locally transform cities according to changing needs of contemporary societies.

The attempt to define a unified model whereby it would be possible to systematically implement solutions that increase the self-sufficiency of cities regardless of geographic location has become the basis for the emergence of several contemporary urban theories. The CPUL's idea was to preserve cultivated land continuity, especially in the traditional model, as a continuous element of the urban structure. However, this solution, proposed on the basic examples of implementing urban agriculture in Africa, seems impossible in western countries. Point solutions of New York or Paris deny most theoretical models by creating an intermediate form that better adapts to local conditions.
REFERENCES


