Turkish Journal of Agriculture - Food Science and Technology, 5(2): 118-124, 2017

Turkish Journal of Agriculture - Food Science and Technology

Available online, ISSN: 2148-127X
www.agrifoodscience.com,
Turkish Science and Technology

The Importance of Edible Landscape in the Cities[#]

Filiz Çelik[*]

Department of Landscape Architecture, Faculty of Agriculture, Selçuk University, 42030 Selçuklu/Konya, Turkey

ARTICLE INFO

[#] This paper is full paper that has been presented as a poster and published as an abstract in the proceedings book in the 2nd International Conference on Sustainable Agriculture and Environment.

Review Article

Received 19 August 2016
Accepted 12 December 2016

Keywords:

Edible landscape
Productive plants
Sustainable city
Urban agriculture
Urban food production

*Corresponding Author:
E-mail: filiz@selcuk.edu.tr

ABSTRACT

The 21st century sustainable city requires the merging of urbanism with sustainable food systems. The challenges industrial food system separates people from their food sources. The design strategies for edible landscape are about re-inviting food back into the city and re-connecting people with their local/regional food system to promote a healthier lifestyle. Edible landscapes are a movement in transition and sprouting up as a response to the slow food movement and living a greener lifestyle. These urban agricultural landscapes are fast becoming iconic media darlings and are demonstrating that they are far more than growing vegetables and fruits on abandoned lots. Edible landscaping is the use of food plants as design features in a landscape. These plants are used both for aesthetic value as well as consumption. Edible landscapes encompass a variety of garden types and scales but do not include food items produced for sale. Edible landscaping is the practical integration of food plants within an ornamental or decorative setting. Using edibles in landscape design can enhance a garden by providing a unique ornamental component with additional health, aesthetic, and economic benefits. In this study; emergence of edible landscape, edible landscape design and maintenance, samples of edible landscape, productive plants, importance of edible landscaping for urban environments have been explained.

Introduction

The land area occupied by cities is not in itself large, considering that it contains half the world's population. However, most urban sites are critical parcels of land. Since many cities are situated at the heart of rich agricultural areas or other lands rich in biodiversity, the extension of the urban perimeter evidently cuts further into available productive land and encroaches upon important ecosystems (Obaid, 2007).

The main objective of the agricultural sector is the production of food and raw materials. Agriculture is the main use of land resources but cities have consumed a large amount of the agricultural land (Anonymous, 2015a). Urban agriculture has become increasingly popular and is referred to in a variety of ways, e.g., urban gardening, urban homesteading, and edible landscaping (Nolasco, 2013). Dormant lands -green fields- can be used to produce crops, and decorative landscapes can be converted into productive landscapes (edible landscape, community garden, allotment garden, rooftop vegetable garden, urban agriculture) with food and medicinal plants (Grichting and Awwaad, 2015). The challenges industrial food system separates people from their food sources (Philips, 2013). People living in urban areas often have little to no green space and are dependent upon outside sources (oftentimes hundreds of miles away) for their food (Hezik, 2016).

In the last years, green infrastructure programs have proliferated in cities. Initially focused on planting trees, restoring habitat, and developing trails and greenways, green infrastructure programs now include storm water management projects. They also include food security projects, such as edible landscaping, community gardens, rooftop vegetable gardens, and public orchards. The collective goal of these programs is to create sustainable urban ecosystems through the development of a dense network of open space, air sheds, watersheds, woodlands, wildlife habitat, parks, and other natural areas that provide the vital services that sustain life and enrich the quality of life (McLain et al., 2012).

This paper aims to provide a conceptual framework to address edible landscape under conditions of the urbanization, agricultural land conversion and population increase.

What is Edible Landscape?

Edible plants are productive plants with parts that are safely edible by humans. Edible landscaping plants are both food plants and ornamental or decorative plants. Edible landscaping is the use of food plants as design features in a landscape. These plants are used both for aesthetic value as well as consumption but do not include food items produced for sale.

Edible landscaping oftentimes called foodsaping is a progressive food systems approach that encourages all people in their homes, public spaces and workplaces to promote local food (Thompson and Sokolowski, 2016). Edible landscaping utilizes food-producing plants in the residential landscape. It combines fruit and nut trees, berry bushes, vegetables, herbs, edible flowers, and other ornamental plants into aesthetically pleasing designs. The location and design of these gardens may vary between large agricultural landscapes, urban areas (e.g. sidewalks, rooftops, and indoors), community gardens, and one's own backyard (Mackalvie, 2014).

Edible landscaping offers an alternative to conventional residential landscapes that are designed solely for ornamental purposes. Edible landscaping is the use of food-producing plants in the constructed landscape, principally the residential landscape (Beck and Quigley, 2001). Edible landscaping, which integrates food-producing plants into ornamental plantings and conventional designs, is also put forward as a productive landscaping alternative (Kourik, 2004).

Edible landscaping, simply put, replaces plants that are strictly ornamental with plants that produce food. Edible landscaping will allow creating a multi-functional landscape that provides returns (fruits, vegetables, etc.) on investment of water, fertilizer, and time. An edible landscape can be just as attractive as a traditional one; in fact, the colorful fruits and foliage of many edibles are quite beautiful. Edible landscapes can include fruits (apple, cherry, fig, pear, strawberry, black berry, kiwi, etc.), vegetables (tomato, pepper, eggplant, bean, lettuce, etc.), medicinal and aromatic plants (geranium, peppermint, thyme, rosemary, sage, echinacea, etc.), herbs, and even contain flowers. These designs can adopt any garden style and may include anywhere from 1-100% edible specimens (Worden and Brown, 2007). Edible landscaping is the practical integration of food plants within an ornamental or decorative setting (Figure 1). Almost any herb works in edible landscaping (Creasy, 2010).

While the same basic factors (i.e., space, money, norms, and social pressure) associated with landscaping styles, general gardening activities, and lawns potentially influence edible garden presence, food producing gardens differ from other yard features in a number of ways. First, edible landscapes provide tangible benefits in terms of fruits and vegetables for consumption. The ability to grow certain foods can be particularly important in maintaining cultural identities, particularly if those items are not readily available for purchase. Second, given that edible landscapes are typically considered a utilitarian feature, they are usually regulated to the backyard (Conway and Brannen, 2014).

Edible landscape types can be residential, institutional, educational and public. Edible landscapes encompass a variety of garden types and scales. Edible landscape may be an integral part of house garden, rooftop gardens, public parks, streetscape, community gardens, backyard plots, schoolyards, campuses, urban forest and green way (Figure 2).

Figure 1 Examples of edible landscapes (Creasy, 2010)

History of Edible Landscaping

Edible landscaping is as old as gardening itself and has undergone a recent revival. Ancient Persian gardens combined both edible and ornamental plants. Medieval monastic gardens included fruits, vegetables, flowers, and medicinal herbs (Beck and Quigley, 2001).

Edible gardens of the Renaissance were as much about pleasure as they were about sustenance. Many of the fruits (figs, pear, apples, strawberries and melons) and vegetables (cabbage, leeks, onions, broad beans, peas, gourds and squash) were commonplace in a Renaissance garden. Renaissance-style gardens produced fruit, vegetables and herbs which are sold locally to raise funds for the maintenance of the chateaux (Figure 3). The only difference is perhaps that in that period (about 1350 to 1600 in Europe), much of the produce grown was part of a peasant diet, while meats were reserved for the upper classes. Now, low-income communities are offered fast-food chains instead of vegetable stands in areas considered to be "food deserts" (Willhelmi, 2013).

Plans for 19th century English suburban yards, which modeled themselves after country estates, often included edible fruits and berries. The edible components of residential landscapes were largely lost in the cities to the now familiar shade trees, lawns, and foundation plantings. In the past two decades, however, there has been a revival of interest in edible landscaping (Beck and Quigley, 2001).

When people think about growing food in urban areas, the first idea is generally to hide the vegetable garden somewhere in the backyard. Edible landscaping offers an alternative to conventional residential landscapes; edible plants can be just as attractive while producing fruits and vegetables. One can install an entirely edible landscape or incorporate some edible plants into existing gardens (Worden and Brown, 2007).

The public perception of edible landscaping has changed greatly in recent decades. Landscapes are freed from the lock-step lawn and shrub restrictions of the last century. Now that edible landscaping has become part of the vernacular and is widely accepted, the edible plant palette has changed dramatically (Creasy, 2010).

The Benefits of Edible Landscapes

Using edibles in landscape design can enhance a garden by providing a unique ornamental component with additional health, aesthetic, and economic benefits (Creasy, 2010). There are many reasons to incorporate edible plants into the residential landscape. These include:

- To enjoy the freshness and flavour of home-grown, fully ripened fruits and vegetables,
- To grow unusual varieties not available in stores,
- To get outside, interact with the natural world, and have fun (Beck and Quigley, 2001),
- To allow users to be more connected to their land and their food while being able to build a food community around them,
- To share foods that are grown with friends and neighbours (Worden and Brown, 2007).

Edible landscapes can be designed in many different forms and at many different scales, to provide an enormous range of benefits for urban residents (Lovell, 2010). Edible landscaping promotes sustainable practices that maximize water and energy efficiency, support wildlife and reduce the use of chemicals in the landscape. Instead of the conventional landscape, edible landscapes offer sustainable benefits (Figure 4).

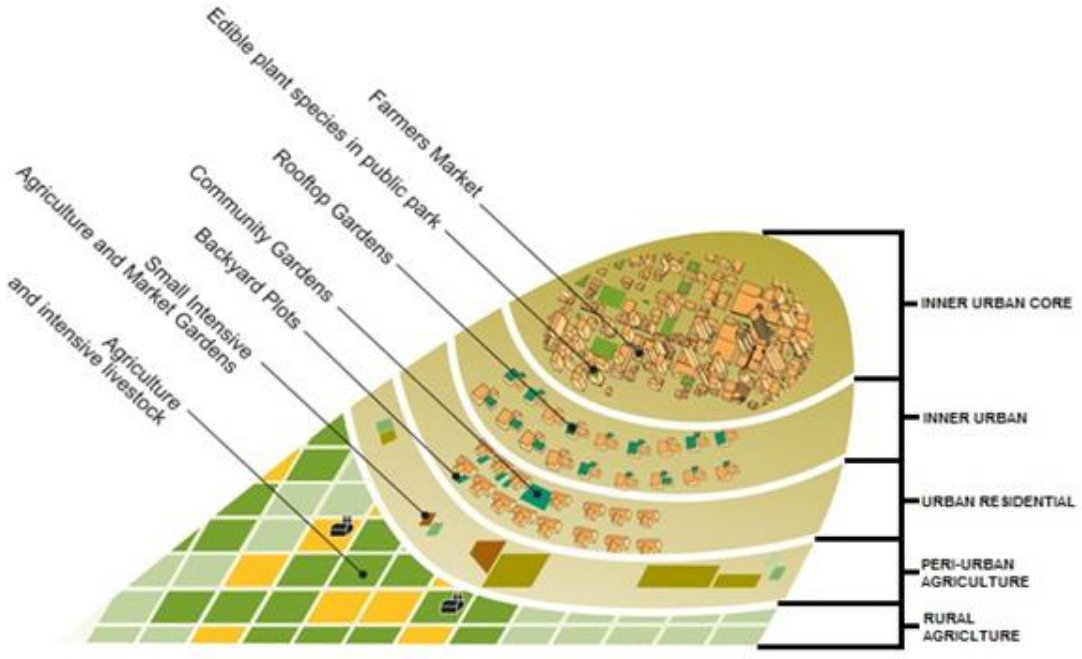

Figure 2 An example of edible landscape in the city (Anonymous, 2015b)

Figure 3 A Renaissance vegetable garden as an endless layout of precise geometric beds (Anonymous, 2016a), (Anonymous, 2016b)

Energy savings: Food from your yard requires no shipping, little refrigeration, and less energy to plow, plant, spray, and harvest the produce.

Water savings: Tests show that most home gardeners use less than half of the water agricultural production needs to produce a crop. Drip irrigation saves even more. And unlike in agriculture, fields aren't flooded and huge vats of water aren't needed to cool down the harvest.

Money savings: Enough food can grow an in a small garden and save money on grocery bills. Certain edibles are highly productive and are more economical to grow at home than to purchase (Worden and Brown, 2007).

Food safety: Edible landscaping is just one example of how communities can begin to address local food insecurity. Increase the food security of household. Control the quantity and kind of pesticides and herbicides used on the foods you consume (Mackelvie, 2014).

Better nutrition: Fully ripe, just-picked, home grown fruits and vegetables, if eaten soon after picking, have more vitamins than supermarket produce that was usually picked under-ripe and is days or weeks old when you eat it (Worden and Brown, 2007).

Healthy community: Many studies have shown links between the edible landscape activities and the health (physical and psychological), social, economic, and ecological benefits.

Edible Landscape Design

Food plants and ornamental plants can co-exist beautifully in a well-designed garden. Many people love the idea of including functional plants (edibles and herbs) in ornamental plantings, but in reality it's not always easy to achieve an acceptable aesthetic without careful design, plant selection, and attention to each plant's growth habit and needs (Sousa, 2016). Edible landscaping is the practical integration of food plants within an ornamental or decorative setting. Edible plants can be combined in many creative ways-with other edibles, or with ornamentals (Figure 5). The same design principles as for ornamental landscapes are used, while substituting edible plants such as lettuces, blueberries, vegetables and fruit trees for some of the otherwise unproductive plant material. Edible landscaping is a mixture of beauty and utility. However, edible landscaping doesn't have to be all edible. In fact, filling the yard with edibles would often produce too much food for most families, not to mention time and work. Instead, careful planning and the judicious use of fruits, herbs, and vegetables results in a yard that is flavorful, practical, visually pleasing (Creasy, 2010).

A visually appealing edible landscape is created from the artful combination of edibles and traditional ornamentals in the garden. Although basic design principles apply, the substitution of edible plants for ornamental plants can present some challenges and opportunities. Although design basics for edible ornamental landscapes are essentially the same as strictly ornamental landscapes, a few details ensure the success of the edible landscape (Hansen, 2016).

Edible Landscape Maintenance

Edible plants, like ornamental plants, require maintenance. Many common ornamental plants can survive with minimal care. Most edible plants, however, require a certain amount of attention to produce well. They may require a little extra watering, pruning, fertilizing, or pest management (Beck and Quigley, 2001). Responsibility for the care and maintenance of the edible landscape must be clearly designated and understood by residents, housing staff, project leaders, maintenance staff, volunteers, and funders (Anonymous, 2005). A schedule for maintenance must be created to ensure proper management of the plot between all parties involved (Nieman and Ressler, 2012).

Reduce maintenance requirements by planting the "right plant in the right place". In other words, be sure to match a plant's growing requirements with local conditions. When growing vegetables (consider the season as well) since they only grow at specific times of the year. All plants require some pruning, fertilizer, and water, as well as monitoring for pest problems.

Figure 4 Sustainable benefits of edible landscapes

Figure 5 Edible plants and ornamentals plants are in the same design

Harvesting is rewarding, but sometimes challenging. Keeping up with ripening fruits and vegetables may require weekly, or even daily, monitoring during the harvest period. If they are not harvested, fruits dropping from trees may be hazardous and/or aesthetically unsightly. Rotting fruits will also attract vermin. Highly perishable crops will require either quick processing, such as canning, freezing, or drying, or friends and neighbors to accept the abundance (Worden and Brown, 2007).

The Importance of Edible Landscaping for Urban Environments

Today, 54% of the world's population lives in urban areas, a proportion that is expected to increase to 66 per cent by 2050. Projections show that urbanization combined with the overall growth of the world's population could add another 2.5 billion people to urban populations by 2050. The urban population of the world has grown rapidly and managing urban areas has become one of the most important development challenges of the 21st century (Anonymous, 2014).

In most countries agriculture is the main user of land resources, and changes in agricultural land use is one of the major driving forces in global as well as local environmental change. Conversion of agricultural land to artificial surfaces (soil sealing) can have several environmental impacts on soil, water and biodiversity resources. A general decrease in agricultural areas has been observed in the last decades in industrialized countries as a consequence of growing demand for nature conservation areas, urban, industrial and infrastructural

areas, amenity areas, and also as a consequence of land abandonment. Many land development activities result in land use change from agricultural land to artificial surfaces: transport infrastructure (motorways, railways, etc.), urban sprawl (housing and industrial developments), tourism and recreation facilities. Increased land development often results in higher prices for land and has an important impact on the environment and agricultural landscapes. The impact is obviously much diversified in the case of a change to urban land compared to the case of land abandonment (Anonymous, 2015a).

High population density, the urbanization process, road infrastructure development, rapid economic growth, industrialization and government policy are believed to be the main factors causing agricultural land conversion (Azadi et al., 2010). The urbanization process has caused constant physical change in the urban fringe landscape, resulting in a mix of urban and agricultural land uses (Malaque and Yokohari, 2007). The urbanization process is one of the most important dimensions of economic, social and physical changes. Rapid urban population growth and urbanization mean an increasing demand for urban land. This land is not available within the city, but in the rural-urban fringe, for various reasons. Urban sprawl is already engulfing the surrounding agricultural lands and small villages (Thuo, 2010). Some cities may find large urban farms an appropriate use of land while others may only be able to accommodate small-scale operations.

Urbanization has resulted in significant changes in both agricultural land and agricultural land use. The urban expansion on agricultural land affects agricultural production negatively. Rapid urbanization is accelerating the loss of agricultural land. Urban sprawl is taken from fertile agricultural lands, which are located immediately surrounding cities; cities have consumed a large amount of the most productive agricultural land (Figure 6), as well as forest and other wilderness areas. Agricultural land losses appear to be related to the change from rural status into urban status. Conversion of agricultural land to urban use has been caused food scarcity (Pham et all, 2015).

Food production may happen everywhere, urban and rural and every top soil. Many urban municipalities are supporting the growth of urban agriculture by adopting regulations enabling different types of food production, while a growing number of non-governmental organizations provide support to urban residents interested in growing their own food (Conway and Brannen, 2014).

Conclusion

More than half of the world's population now lives in towns and cities, and by 2030 this number will swell to about 5 billion. The world will have to confront how to make cities more fit for human nutrition. The conclusions of the reports have been released by the United Nations, raising new challenges including diseases, water scarcity and food production. The world is undergoing the largest wave of urban growth in history. Cities have been located in the midst of high quality farmland places so food production has been dramatically affected negatively by extreme urban sprawl incidents (Anonymous, 2015c). Because the cities consume natural areas and farmland, it is needed alternative areas in the cities for food production. Urban green spaces are potential areas where may be used for food production in the cities.

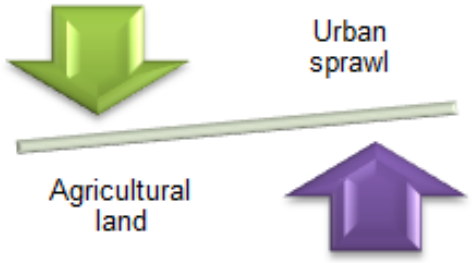

Figure 6 The relationship of urban sprawl and losing agricultural land

Edible landscaping is expanding in many cities throughout the world. Edible landscapes can be included as sustainable components of urban planning and urban design projects. Edible landscape, like other green spaces, provides many benefits in terms of ecological, economic, health, social and cultural. The results of the study clearly indicate that the edible landscapes:

- Edible landscapes can be a part of residential landscape, community garden and urban green areas.
- The main purposes of edible landscape are re-inviting food back into the city and re-connecting people with their food system to promote a healthier lifestyle.
- Edible landscapes can be educational areas for people. Children, youth and adults who live in cities could learn information about how to grow fruits and vegetables in urban green areas. Children are growing up in a world farther and farther from agricultural land. They don't answer where fruits and vegetables grow. Edible landscape may connect children with the source of food and will help both youth and adults re-connect with their food and nature.
- Working in the edible landscape provide an environment for children, youth and adults to simultaneously socialize, have fun, feel relieved and get exercise.
- Edible landscaping provides a means of preserving and enhancing the existing functions of urban green areas while generating a yield.
- Edible landscapes are sustainable landscape systems consistent with the philosophy of ecological design. An edible landscape (if maintained using organic methods) is the most compelling landscape concept for the future.

- Edible landscapes can help food production for low-income people who live in cities.
- Edible landscapes can improve quality of life in cities.
- Edible landscapes create an ecosystem and habitat for animals and plants in the cities and improve urban biodiversity.
- If it is better integrated into the green infrastructure of the city, edible landscape contributes to a wide range of ecosystem services.

References

Anonymous 2005. The Edible Landscaping Toolkit An informational guide for low-income housing settings to develop a healthy and productive landscape, Sacramento Hunger Commission, http://www.miwaterstewardship.org/Portals /0/docs/Reports-Research/The%20Edible%20Landscapin g%20Guide.pdf, [18.10.2016].

Anonymous 2014. World's population increasingly urban with more than half living in urban areas. http://www.un.org/en/ development/desa/news/population/world-urbanization-prospects-2014.html, [08.04.2016].

Anonymous 2015a. Agri-Environmental Indicators-agricultural area use change. http://faostat.fao.org/site/690/default.aspx [20.06.2015].

Anonymous 2015b. Municipal Development Plan (MDP). http://planhorsehill.com/overview/background/ [26.03.2015].

Anonymous 2015c. Urbanization, http://www.unfpa.org/ urbanization [28.04.2016].

Anonymous 2016a. The World's most incredible gardens, http://eatwithmeblog.tumblr.com/post/9111035457/the-worlds-most-incredible-edible-gardens [17.07.2016].

Anonymous 2016b. Villandry Garden, http://commons. wikimedia.org/wiki/File:Villandry_Garden_09.jpg, [17.07.2016].

Azadi H, Ho P, Hasfiata L. 2010. Agricultural land conversion drivers: A comparison between less developed, developing and developed countries, Land Degradation&Development, 22 (6): 596-604, DOI: 10.1002/ldr.1037.

Beck TB, Quigley MF. 2001. Edible landscaping, horticulture and crop science, Extention Fact Sheet, Ohio State University, USA.

Conway TM, Brannen K. 2014. Who is tending their garden? Edible gardens as a residential landscaping choice. Cities and the Environment (CATE), 7(2), article:10.

Creasy R. 2010. Edible landscaping, San Francisco. Sierra Club Books, ISBN:978-157805-154-0.

Grichting A, Awwaad R. 2015. Sustainable urbanism: towards edible campuses in Qatar and the Gulf Region. True Smart and Green City? 8th Conference of the International Forum on Urbanism (IFoU). Korea, pp: 125-138.

Hansen G, 2016. Landscape design with edibles, http://edis.ifas.ufl.edu/ep475 [26.03.2016].

Hezik A, 2016. Transforming the office of sustainability's front yard into an edible landscape. Honors College Capstone Experience/Thesis Projects. Paper 611. pp: 70. http://digitalcommons.wku.edu/stu_hon_theses/611.

Kourik R. 2004. Designing and maintaining your edible landscape naturally. UK. Permanent Publications, ISBN:1 85623-026-0.

Lovell ST. 2010. Multifunctional urban agriculture for sustainable land use planning in the United States. Sustainability, 2, 2499-2522; doi:10.3390/su2082499.

Mackelvie I. 2014. Edible landscaping: student themes and implications for decolonization, The Faculty of Humboldt State University, Master Thesis, pp: 43.

Malaque IR, Yokohari M. 2007. Urbanization process and the changing agricultural landscape pattern in the urban fringe of Metro Manila, Philippines, Environment & Urbanization, 19(1): 191–206, DOI: 10.1177/0956247807076782.

McLain R, Poe M, Hurley PT, Lecompte-Mastenbrook J, Emery MR. 2012. Producing edible landscapes in Seattle's urban forest, Urban Forestry & Urban Greening, 11(2): 187-194, DOI:10.1016/j.ufug.2011.12.002.

Nieman A, Ressler A. 2012. Enchanted Edibles Campus Sustainable Planning Studio, Western Washington University, Washington.

Nolasco J. 2013. Sustainable Water Management for Urban Agriculture: Planting Justice, Oakland. Pacific Institute, http://pacinst.org/app/uploads/2013/02/sustainable_water_management_for_urban_agriculture3.pdf [30.09.2016].

Obaid TA. 2007. State of World Population 2007. http://www.unfpa.org/sites/default/files/pub-pdf/695_filename_sowp2007_eng.pdf [25.07.2016].

Pham VC, Pham TH, Tong THA, Nguyen TTH, Pham NH. 2015. The conversion of agricultural land in the peri-urban areas of Hanoi (Vietnam): patterns in space and time. Journal of Land Use Science, 10(2): 224-242, DOI: 10.1080/1747423X.2014 .884643.

Philips A. 2013. Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes. New Jersey, John & Wiley Sons, Inc., ISBN: 978-1-118-07383-4.

Sousa E. 2016. Mixing It Up-Can Edibles and Ornamentals Get Along in a Designed Garden?, http://www.ecolandscaping.org /02/edible-landscaping/mixing-it-up-can-edibles-and-ornamentals-get-along-in-a-designed-garden/ [21.10.2016].

Thompson M, Sokolowski S. 2016. Edible Landscapes in Business Owned Green Spaces, http://www.wrfoodsystem.ca/files/ www/Edible_Landscaping.pdf [16.10.2016].

Thuo ADM. 2010. Community and social responses to land use transformations in the Nairobi rural-urban fringe, Kenya, Field Actions Science Reports (Online), Special Issue 1, http://factsreports.revues.org/435 [28.08.2015].

Willhelmi C. 2013. Edible gardening in the renaissance. The online magazine of the Getty, http://blogs.getty.edu/iris/edible-gardening-in-the-renaissance/ [19.09.2015].

Worden EC, Brown SP. 2007. Edible Landscaping, http://edis.ifas.ufl.edu/ [11.05.2016].