

**Reducing ecological footprint: a case study of Miracle gardens,
Varaždin (Croatia)**

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Introduction

In 2050, two out of every three people will live in a city (UN, 2012). The urban population of Croatia was last reported at 57.8% (The World Bank, 2012) on 8.4% of the land (CBS, 2013). With 0.06% of the world population, 0.09% of the globally inhabitable surface and 0.08% of global CO₂ emissions (UN, 2011), Croatia is often looked on as an observer on the side when discussing global environmental strategies. It should be noted that agriculture in Croatia causes 11.75% of greenhouse gas emissions (CEA, 2013), and if one counts the total emissions that support food production, such as energy, product transportation, processing and storage, the share rises to 30-40% of the total emissions (Znaor, 2009).

The ecological footprint (EF) can be simply described as one of the techniques to answer the question of how our lifestyle affects the planet Earth. Croatia's total ecological footprint was estimated at 4.19 global hectares per person (gha) with a total biocapacity of 2.92 gha (WWF, 2012), so that the ecological minus of Croatia amounts to 1.27 gha. The ecological footprint that emerges from the greenhouse gas emissions in the Croatian agricultural sector is estimated at around 73 million euro per year (Znaor, 2008).

Urban lifestyles are linked to the global climate change crisis. Today, urban dwellers do not really live in a *civilisation*, but in a *mobilisation* – of natural resources, people and products (Deelstra & Girardet, 2000). For the urban population, growing their own food may be one of many options to achieve low-footprint lifestyles, considering that more than 33% of the average Croatian salary is spent on food (CBS, 2013). Local, community-grown food also does not require import using long-distance transport, which further depletes our fossil fuel reserves. If more cities were to produce food within their boundaries, the transport of products could be reduced; this would contribute to reducing CO₂ emissions and other polluting gases (Deelstra & Girardet, 2000).

While community gardens in many countries make it possible for families in the cities to produce food on their own plot of land, this idea is still in its infancy in Croatia. The occurrence of community gardens has been marginalised in domestic research and theory, as well as in the sustainable development concept for Croatian cities (Othman, 2012). Currently, there are less than ten community gardens in Croatia, including the Miracle gardens that help the inhabitants of Varaždin to reduce kilometres from field to fork.

Case history

In 2012, in the city of Varaždin, an enthusiastic group of four created a non-profit association, called Garden bed. The main goal of the association is to promote and implement practical local solutions in the wide area of sustainable living, which refers to food production, energy, traffic and construction, using low-tech solutions and innovative methods. Association`s first project is a community garden, which goal is to offer residents a small plot of land on which they can grow their own vegetables and fruit, respecting the principles of organic production. From idea to realisation, it all developed so miraculously fast that the gardens got their name from it – Miracle gardens.

Project description

The project started in February 2012. The initiative to start the project came from the Garden bed association, while the city management supported the project by ensuring the necessary land. The goal was to turn unused meadows into ecosystems. There is plenty of unused agricultural land in the city area, so the association was awarded 7,700 m² of land for a period of 5 years. Initial land preparation was organised by the association, as well as setting up the infrastructural elements (water pumps and tool sheds) and creating gardens in accordance with permaculture design principles. By the end of April 2012, when the invitation to interested residents was published in the local newspapers, the garden beds were ready for 56 new users.

Location

Located in North-Western Croatia, along the Drava river, the city of Varaždin is surrounded by fertile alluvial plain around 170 meters above sea level. Miracle gardens are located in Biškupec, 4 km from the city centre.

Table 1: Basic facts on Croatia and Varaždin

	Croatia	Varaždin
Area	56,594 km ²	59.45 km ²
Population	4,284,889	46,946
Density	77.8/km ²	790/km ²
Urban population	57.8% on 8.4% of the land	-
Urban population growth (annual %)	0.4	no data
Agricultural workforce in % of population	2.1%	-
Climate	Continental	Continental
Mean annual air temperature	12-17°C coastal region 10-12°C northern plains 4-10°C mountain region	10.4°C
Mean annual precipitation quantity	600 – 3,500 mm	900 mm

Source: CBS, 2013

Transformation from meadow into ecosystem

The available land is divided into 56 plots, each with a surface of 50 m², which is enough to cover the vegetable needs for two adults. When awarding the plots, all the residents were equally entitled to it, if they committed to producing organically. The majority of gardeners use organic methods and products against weeds and pests, while some do not fight weeds and pests at all. As a fertiliser, horse manure from a nearby farm is used, along with herbal preparations made of nettle, comfrey and tansy, which also serve for fighting the pests. All sorts of organic matter (grass clippings, hay) were collected for use as mulch.

The most common crops are tomatoes, peppers, zucchini and lettuce. Other plants also do well; watermelons, black radishes, corn, carrots, cucumbers, beans, amaranth and old types of vegetables whose seeds are found through local seed exchanges. Lavender, sage and flowers are scattered throughout the garden. In the common garden area, one can plant fruit tree for all to enjoy later.

Not much goes to waste on Miracle gardens. Even though there is no joint compost pile, wooden compost bins exist on individual plots. Along with plant remnants from the garden, gardeners bring their household waste. This is especially important because the share of Croatia`s organic waste in total household waste is above 60% and only 1% of communal waste is subject to an organized composting (CEA, 2007).

Water is the most important factor in any garden, therefore gardeners have easy access to 9 water pumps. Whether they will be watering with a watering can or placing an irrigation system is their own choice. Within the fenced garden are tool sheds and waste containers, surrounded by trees kept as a habitat for diverse species.



Fig.1: Miracle gardens before (March 2012) and after (August 2012)
(Photo credit: Garden bed association, 2012)



Fig. 2: Miracle gardens layout (Photo credit: Garden bed association, 2012)

From the community and sustainable development perspective

A community garden needs one special component to make it great – a community! Miracle gardens are more than a place for growing food and flowers. This is best presented by the thoughts of the gardeners:

"We have our own little plot of land where we spend our free time, in the fresh air and in nature, exchanging experiences and making new friends, and as well as all this we have the pleasure of eating our own vegetables for the entire summer."

"Here we are distanced from the stressful everyday life that it is not easy to change."

"There is no greater happiness and joy than when the plants bear fruit!"

The youngest gardener is 9 year old Jan who says:

"It is great that we have a garden because I miss nature in the city very much."

There are different motives behind joining the project, including saving money, supplying households with fresh products, avoiding the questionable food quality, high food prices and the undiversified offer of vegetables on the market. Even though *"contribution to the sustainable development of the city"* is among the lower ranked motives, 80% of the users do not agree with the statement *"The sustainable development of the city is not important to me"* (Othman, 2012).

The users actively participate in managing and maintaining the garden, respecting the rule that everyone helps everyone. Some of the gardeners are from farming backgrounds, while others have never grown a plant. For this reason the association got in touch with other similar associations and organised the workshop "Seeding techniques and the importance of preserving the seeds of old species" which promotes the importance of preserving seeds and the production of local food. Examples of their work and solutions have been presented to the wider public in order to be able to incorporate them into everyone's lives for becoming more sustainable and independent. In addition, they cooperate with local craftsmen when it comes to purchasing and maintaining garden tools.



Fig.3: Miracle gardens are more than a place for growing food and flowers
(Photo credit: Garden bed association, 2012)



Fig.4: A community garden needs one special component to make it great – a community! (Photo credit: Garden bed association, 2012)

Funding

The annual budget necessary for the maintenance of the gardens amounts to 1,500 €. Each of the 106 plots are rented for the symbolic fee of 13 € per year, which is used for the current maintenance of garden equipment and thus the garden is financially completely self-sustainable. All donations received are used for gardening workshops, raising ecological awareness through various seminars and lectures, open to the gardeners and the interested public.

Results

Miracle gardens have grown in size and popularity. In 2013 the gardens have 50 new users, a total of 106 gardeners and their families, who cultivate their land on a surface of around 1 ha, while 14 interested residents are on the waiting list.

The "growing" interest resulted from more than 100 appearances in printed media, TV reports, radio and internet media throughout Croatia and the wider region. The association is contacted daily by individuals and local self-government in order to get advice on how to start such a project in their own community. Driven by the examples of good practice in Varaždin, a group of activists and enthusiasts gathered in the Nettle association decided to launch a community garden in Koprivnica. The city administration often mentions the project as a successful example of cooperation between citizens and authorities.

In just one year the project has been recognised as a successful social project; at the end of September 2012, Miracle gardens won 15,000 € donation from Zagrebačka banka, in the "Innovation" category. Moreover, recently in Vienna, at the SozialMarie award competition, the project was selected among 308 applications from 6 countries as the third best social-innovative project in the region and was awarded 5,000 €, with the following explanation:

„Healthy and affordable food for all who participate, organic farming, the conservation and recovery of species diversity, self-organized work on a communal basis, and self-sustaining cooperation in solidarity with one another. Its impact extends far beyond the people directly involved and it has already become a model for other towns and cities.“

The results suggest that the community garden can act as a model for the implementation of social, economic and environmental policies at the local level.

Plans for the future

The project and the people behind it do not lack creative ideas for the future. The donations will be spent on improving the garden infrastructure, whereby the users themselves will take care of the majority of the jobs. The plans encompass the following:

- Solar irrigation pump
- Planting a berry fence
- Building of an arbour and joint meeting area
- Building of a children's playground
- Building of raised garden beds for the disabled, if there will be any interest
- Building of a greenhouse for growing seedlings
- Building of a grill
- The renewal of tools and garden equipment

Conclusion

As stated in the introduction, our ecological footprint explains how we live. Fortunately, some people have taken a stand by introducing activities that reduce our ecological footprint. With every bite of food raised from community gardens, negative environmental impacts are reduced in numerous ways; first, due to the fewer kilometres travelled and lower CO₂ emissions released and second, due to the smaller environmental impacts because of organic farming. The initiators of the project have shown that public surfaces can be used productively, while the residents of Varaždin have shown that they want to grow healthy food themselves. The involvement of the city's residents is a crucial part of ensuring the success of innovative projects like this one. The most lasting of the Miracle gardens resources are the skills acquired by its participants. For the local government, this is just one of the measures that can be implemented to reduce GHG emissions. In addition, investing in community gardens is necessary just like developing any other public goods network.

Therefore, the greatest potential of this project is that other Croatian cities will follow suit in the foreseeable future.

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