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UNIVERSITY OF SHKODRA "LUIGJ GURAKUQI"  
FACULTY OF NATURAL SCIENCES  
BALKAN ENVIRONMENTAL ASSOCIATION (BENA)

2<sup>ND</sup> INTERNATIONAL CONFERENCE  
RESEARCH AND EDUCATION IN NATURAL SCIENCES

# PROCEEDINGS BOOK

## Volume 2

Shkoder, November, 2013



UNIVERSITY OF SHKODRA "LUIGJ GURAKUQI"  
FACULTY OF NATURAL SCIENCES



BALKAN ENVIRONMENTAL ASSOCIATION  
(BENA)

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**2<sup>ND</sup> INTERNATIONAL CONFERENCE  
RESEARCH AND EDUCATION IN NATURAL SCIENCES**

# **PROCEEDINGS BOOK**

## **Volume 2**

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## URBAN AGRICULTURAL AS A MODEL OF SUSTAINABLE SOCIAL AND ENVIRONMENTAL MANAGEMENT

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### ABSTRACT

Croatia is a new member of European Union. Through the accession process Croatia can use IPA subsidy programme for 5 components. One of this is development of human resources. Financed in this IPA component, Faculty of agricultural in Osijek is implementing the project "Eco Educo Park - social inclusion and employment model". The idea for this project is based on innovative concept of urban agriculture model and sustainable principle of "zero km-low CO<sub>2</sub> emission". Outline of the project is a practical training ground installed in a residential area in centre of city of Osijek with raised bed garden and a plot for local composting of bio waste collected from tenants.

The "Eco Educo Park" is based on innovative and comprehensive concept raised garden bed technology, which is amongst other, used for "Urban agriculture programme" as a model for reducing the risk of poverty. With using this model is possible produce food for whole family on very small plots. The project "Eco Educo Park" in first step will educate a number of social disadvantage persons about using this way of food production. In second step, leader of project intent to promote and implement this model for national programme of public works on local level in small cities and municipalities. In this work will present a part of experiences in this and similar project of Faculty of agriculture in Osijek.

**KEYWORDS:** education model, sustainable local food production, environment management, development projects

### *Introduction*

In the Republic of Croatia, the degree of self-sufficiency of agricultural production has declined significantly in the last ten years. The Croatian population has long been coping with adversities created jointly by the political advocates of the interests of big business and public administration. Thus, the Croatian agriculture has become a hostage of bad political decisions that are primarily reflected in the large number of failed family farms and enormous trade deficit in agriculture and food industry, with a tendency of further growth. The cost of this policy is being paid by citizens through increased prices of agricultural products and impaired food quality due to increasing imports of low-quality food.



Leading Croatian macroeconomic analysts and many farmers' associations have been warning about these problem issues in vain and unsuccessfully for years. However, their voice is only poorly being heard as urban population, faced with economic crisis and poverty, is not aware of devastating economic consequences of industrial food production methods.

Since 2007, Croatia benefits from IPA program for assistance and development. Within the scope of this program, there is a program aimed at strengthening human resources which are considered crucial for initiating development processes. Within this program, the Faculty of Agriculture is implementing the IPA project "ECO EDUCO PARK - model of social inclusion and employment" aiming at establishing stronger urban-rural connections and creating new social consciousness of the need for cultivation of organic food, better management of local population's nutrition and better environmental management. This work represents a contribution to the popularization of sustainable models of food production from the social, economic and environmental point of view.

### **Material and methods**

This paper analyzes the economic trends of the decline of Croatian agriculture and related indicators of poverty growth in the Republic of Croatia. Furthermore, this paper lays out a part of the worldwide experiences in solving the problems of the poor and marginalized social groups through attempts of their social inclusion through implementation of urban agriculture.

The purpose of this paper is to present the public with good effects of practicing urban agriculture and to encourage political and scientific public to give preference to the model of local food production for the local market, which meets the requirements of sustainable development, that is, of the reduction of CO<sub>2</sub> emissions and reduction of transportation.

Several agroeconomists from the Faculty of Agriculture began a series of small projects for the implementation of this model in wider use in order to raise awareness, educate and engage the public. The projects are being implemented in kindergartens, schools and associations. Since March 2013, the Faculty of Agriculture has been implementing the IPA project, funded by the EU with 115.000 euro, setting out the model of social inclusion of marginalized groups with an emphasis on fight against poverty. Parts of the experiences of this project are set out in a case study.

### **Results and discussion**

#### ***Decline of agriculture in the Republic of Croatia and its consequences on the decline in the standard of living of the total population***

In 2008, Croatia entered into an economic recession and as yet, the possible pathways of recovery are not discernible. The situation is most difficult in the villages where, due to severe failing of family farms, excessive imports and lack of organization of small producers, rural population loses the only source of livelihood. According to Croatian Bureau of Statistic (CBS) the overall GDP

per capita of urban areas in 2010 was significantly higher than the GDP of rural population, which stood at 18.645,17 Euro for urban and 7.918,36 Euro for rural areas. Further decline in GDP led to an increase of migration trends of the rural population towards the cities, increasing also the total growth in the poverty rate of the urban population. Namely, the overall share of the population at risk of poverty rose from 18.9% in 2008 to 21.1% in 2011 (CBS, 2012, Eurostat, 2012), which puts Croatia in 27<sup>th</sup> place out of 31 European countries. In recent months, with the Croatian accession to the EU, the budget deficit has significantly increased, due to additional commitments Croatia is paying for the membership in the EU. Despite the growing state deficit, the import of food products grew as well. In 2012, the amount of imported food reached two-thirds of the food consumed in Croatia, and export-import ratio was only 55% (Figure 1.).

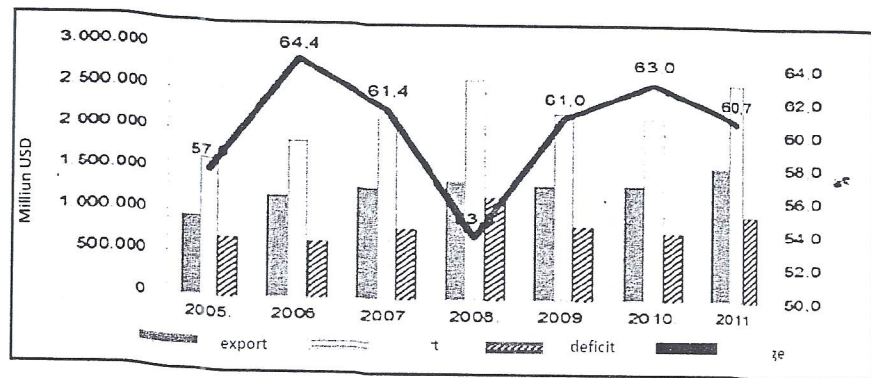


Figure 1: Export and import of agricultural and food products  
Source: Croatian Bureau of Statistic, 2012

How difficult the situation in rural areas is, can be inferred from a brief overview of Croatian agriculture. In particular, the Croatian agriculture relies on a big number of family farms, which represent 99 % of the total number of agricultural holdings, owning 84 % of the total agricultural land. (Table 1) Rural areas, which are characterized by a large number of small-scale farms and high unemployment, are the most vulnerable. Due to bankruptcy and the loss of numerous workplaces, agricultural employment increased to almost 24% of the total regional employment in the 1900s. The number of part-time farms halved in the period from 1991 to 2003. An average farm size is about 2.8 ha of arable land (Tolić & Lončarić, 2005). They practised agriculture for their own existentially needs. With the growth of the Croatian economy, the social transfers to the village grew as well (forced retirement and social assistance), which has significantly influenced the reduction of agricultural activities for the purpose of additional income and livelihood. Croatia has a high share of arable land in total agricultural land, amounting to almost 68%. Due to the excessive growth of the import of field crops and reduced prices of milk, wheat, maize and industrial crops, there has been a sig-

nificant drop in productivity in agriculture (Table 2) and a further loss of interest of producers to invest in agriculture (Table 2) and a further loss of interest did not aim at significantly stimulating the production of labor-intensive crops with higher share of added value. For example, Croatia imports over 70% of the vegetables consumed in its territory even though Croatia has all the conditions necessary for this type of production. Consequently, in the last two years, the number of farmers with registered status decreased from 64 000 to only 32000 employed agricultural workers in 2013, which makes up only 2.2% of the total population of employed workers (Source: CBS, Monthly statistical report July 2013).

Table 1 Agricultural holdings in Croatia, situation as on 1 June 2010.

	Utilised agricultural area 1000 ha	%	Number of agricultural holdings	%
Private family farms	1 103	84	230 173	99
Business entities	210	16	2 155	1
Agricultural holdings in total	1 313	100	232 328	100

Source: Croatian Bureau of Statistic

These trends have a long-term presence in Croatia, nearly two decades. Besides the loss of potential revenue of GDP, these trends affect younger generations' loss of interest to engage in agriculture and the permanent loss of knowledge and skills of the rural population in food production. That reflects in fewer interests of pupils and students for agricultural occupations, which leads to permanent losses of human potentials in for this economical important branch of production.

According to EU Commission document "A View on Employment, Growth and Innovation in Rural Areas, the situation has deteriorated. Namely, rural regions are permanently losing youth and potential for generational renewal in rural regions.

Table 2: Indicators of productivity in agriculture in Republic of Croatia

Indicator	Unit	2008	2009	2010	2011	2012
Bruto added value of agriculture (BAV)	Million Kn	10.988	10.563	9.984	9.652	8.660
Share of BAV in total GDP	%	3,20	3,21	3,08	2,92	2,62
Share of agricultural BAV in total BAV	%	3,74	3,74	3,60	3,41	3,09

Source: Croatian Bureau of Statistic, 2008-2012

With a significant reduction of agricultural activities, Croatia has lost a large number of active farmers, which resulted in an increased migration towards cities, in which the number of socially disadvantaged groups is growing (Table 3). Experiences show that the poor rural migrant people generally do not practice

agricultural production upon their arrival in a city, which increases their food dependency.

Table 3: Poverty indicators

The number of beneficiaries of social welfare in CROATIA in the period of 2010 to 2012			
Permanent support allowance	2010	2011	2012
Total allowance (singles and families)	46.246	46.189	49.254
Total number of persons covered	102.668	104.112	110.794

Source: Ministry of Social Affairs and Youth, Annual Statistical Report Ministarstvo 2012.

Poor urban dwellers, being largely net food buyers and depending mostly on markets for their food supplies, are particularly vulnerable to adverse food price shocks, and are consistently the group in society that suffers most from higher food prices (Zezza et al., 2008; Dessus et al., 2008).

#### *Urban agriculture – Social sustainability*

Around the world, there is a dominance of cities over rural areas. The processes of globalization contribute to strengthening of deruralisation processes, which affects the increase of migration from rural to urban areas and which puts the issue of urban sustainability on the community's agenda.

The process began in Rio with Agenda 21: „We need to respect the carrying capacity of ecosystems and preservation of opportunities for future generations. ...Science and technology have a crucial role in shaping sustainable human settlements and sustaining the ecosystems they depend upon.” This is continued at the 1996 UN City Summit in Istanbul “Human settlements shall be planned, developed and improved in a manner that takes full account of sustainable development principles and all their components, as set out in Agenda 21”. Further growth of cities requires rethinking of the social and environmental sustainability. The urban agriculture is developing in this direction with a very wide range of simple solutions for food production, which are being acknowledged in today's practice.

Urban agriculture is a system that ensures food security by providing access to land and resources to support urban farming efforts (Brown&Carter, 2003). The United Nations defines urban agriculture as follows: [A]n industry that produces, processes, and markets food and fuel, largely in response to the daily demand of consumers within a town, city, or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock. (Smit et al, 1996).

The model of urban agriculture helps to reduce the gap between people of different social and economic classes and encourages the community to reflect the equitable distribution of natural resources.

A society where some segments consume more than their share of resources results in current social inequity as well as inequity between current and fu-

ture generations (Peters, 2010). Fairer distribution of resources, keeping in mind the current and future generations, is the key to achieving social, economic and environmental aspects of sustainability. Regarding intragenerational equity, all members of society "should have a satisfactory quality of life, particularly with respect to access to resources and development opportunities" (Peters, 2010).

Also, concept of "Urban agriculture" is recognised as very **successful model for problem of social inclusion and poverty**. Urban agriculture contributes to strengthening social cohesion in the community and a spirit of cooperation. There are a number of such examples as an example of city farming in Albania (Chisholm, 1996), organic farming in Cuba (Gonzales), urban agriculture in Boston (Gittleman, 2009) etc. In fact, many papers indicate multiple positive impact of urban agriculture on the issues that cause poverty and social exclusion as well as their consequences.

Urban gardens provide educational and employment opportunities, promote self-respect, and can even reduce crime rates (Borrelli, 2008). Finally, urban gardening provides low income urban residents with a supply of fresh and healthy organic food that can combat problems associated with inadequate nutrition, such as illness, fatigue, depression, anxiety, and hunger (Peters, 2010).

The Faculty of Agriculture in Osijek is implementing the project ECO EDUCO PARK - model of social inclusion and employment. It is a classic Cuban model of urban agriculture aiming at instigating rural and urban population to significantly raise the self-production of food, that is, to produce the food that will meet the needs of the local population. This model is known for the system of elevated garden beds that have proven to be more effective and safer for production under uncertain weather conditions, and which, at the same time, offers a solution for the recycling of biowaste from households, which is very important for the cities.

Urban farming is a new phenomenon in the social way of organizing food production and, as such, it is increasingly in use for two reasons: 1) it gives impetus to local residents for organic food production which is also an environmentally friendly behavior; 2) it reduces the risk of poverty for the most vulnerable social groups. However, its effects are poorly represented in the scientific and general public.

#### *Urban agriculture – Environmental sustainability*

Preservation and protection of natural resources and reduction of human impact on the environment are preconditions for achievement of environmentally sustainability. The Agriculture industry is one of the biggest polluters among the industries. Opinion of some scientist is that transitioning from an industrial agricultural system to a sustainable urban agricultural system could minimize the impacts of food production on the planet.

Urban farming can help to create an improved microclimate and to conserve soils, to minimise waste in cities and to improve nutrient recycling, and to improve water management, biodiversity, the O<sub>2</sub>-CO<sub>2</sub> balance, and the environmental awareness of city inhabitants (Deelstra&Girardet,1999). Urban agriculture reduces the consumption of undeveloped land for farming. Food would be

produced in areas that are already developed and populated, thereby conserving open space for natural habitat (Peters, 2010).

Recently, there has been more and more talking about the ecological footprint. The ecological footprint is the area of land necessary to supply food, energy and other resources needed to maintain the current high-consumption lifestyle. It is measured in hectares and shows how much surface particular city or state needs to meet its needs for food, housing, energy, transport or waste disposal (Šimleša, 2010).

The concept of an urban ecological footprint can be used to help illustrate how surrounding rural and natural areas are being affected by cities. Ecological footprint analysis assumes that every category of energy and material consumption and waste discharge requires the productive or absorptive capacity of a finite area of land or water (Wackernagel & Rees 1996).

Due to the proximity of urban gardens to dwellings and other buildings, urban agriculture must be performed without the use of large machinery and without the use of chemical pesticides and fertilizers (Crawford, 2003). While lack of such inputs could be perceived as a challenge, urban gardening methods may result in increased crop yields on smaller plots of land than conventional farming practices achieve. Rather than maximizing crop yields through extensive use of chemicals, sustainable agriculture relies on crop rotation, composting, biofertilizers, and other organic farming techniques to improve soil fertility (Gonzalez, 2003). Organic fertilizers reduce the amount of waste deposited in landfills because they are made from composted and recycled food waste, leaves, and lawn clippings (Brown & Carter, 2003).

The Croatian island of Krk, a known tourist destination, is worth mentioning as an example of good practice. For many years now, island's utility company Ponikve has been organizing a selective collection of biowaste and its recycling into biocompost. In cooperation with the local association of organic olive producers, the exploitation of biocompost for organic cultivation of olive trees has been organized, which contributed to the increase in organic olive oil production on the island ([www.ponikve.hr](http://www.ponikve.hr)).

***Case study: IPA project „ECO EDUCO PARK – social inclusion and employment model“***

The Faculty of Agriculture in Osijek, in cooperation with its partners, has designed and is implementing the project "ECO EDUCO PARK". Partners in the project are: Croatian Employment Service, Centre of energy Ltd and the Local Action Group Baranja. Period of implementation is from 16th March 2013 till 15th June 2014. Project is being implemented in the area of City of Osijek.

The project is going to increase the social inclusion and employability of marginalised and disadvantaged groups and prepare them for labour market integration through provision of psycho-social support and through improving their competencies for urban horticulture production. In order to provide participants with appropriate support and learning, their needs and potentials will be identified through individual assessments and counselling. The psycho-social support programme will include strengthening of motivation for taking on an

active role in employment, empowerment of existing and developing and practicing new social skills, as well as practical activities of preparing participants for taking on a more active role in society and active approach to employment. The psycho-social support will be carried out by interdisciplinary professional team, which will include: psychologists, social workers and social pedagogues. Furthermore, participants will get general and specific theoretical and practical knowledge for working in ecological horticulture production that includes vegetable growing, floriculture, fruit-growing, vineyard and landscape architecture (bio-waste management, composting, vegetable growing, etc.). After the education, they will obtain a certificate issued by the Faculty of Agriculture in Osijek, stating that they have completed education for "Ecological horticulture auxiliary worker". All of this will increase their competitiveness in the labour market. Additionally, by equipping and putting into operation the ecological park for education and production - "Eco Educo Park", long-term unemployed social care and assistance beneficiaries will be directly involved in work activities, which will increase their practical knowledge and skills as well as their work habits. The "Eco Educo Park" is based on innovative and comprehensive concept of raised garden bed technology. This is an innovative, high production technology using bio compost, which is, amongst other, used for "Urban agriculture programme". UNDP (1996) defines UA as follows: "Urban Agriculture (UA) is an activity that produces processes, and markets food and other products, on land and water in urban and peri-urban areas, applying intensive production methods, and (re)using natural resources and urban wastes, to yield a diversity of crops and livestock". Eco Educo Park will represent an example of the cycle of local production for local consumption without transports and other costs which will provide participant with an insight about the opportunities for self-employment and self-sufficiency farming.

Initiators of the project want to demonstrate that it is possible to produce food for whole family on very small plots using "Urban agriculture production model". The "Eco Educo Park" is located in the court-yard of a low-energy multi-story dwelling, which tenants will get green bags and containers for collecting bio waste for compost production. The cooperation with tenants should have positive impact on participants and encourage them for taking on a more active role in community. Especially, the project will increase the practical knowledge and skills of participants for working in organic horticulture production. These knowledge and skills are also insufficiently developed at the national level, which is being recognised in The Action Plan for the Development of Organic Agriculture in the Republic of Croatia 2011 -2016.

Furthermore, one of the project's outputs will also be developed manual which will be useful to participants and other disadvantaged and marginalised people during and after the project. Also, information and promotion campaign will increase the level of information of potential employers, local governments and general public about marginalised and disadvantaged groups' employment possibilities in urban agriculture. Through the ECO EDUCO PARK project, the partnership between educational sector, CES, local government and private sector has been established. This will enable application of holistic approach and

innovative action for social inclusion and employment of marginalized and disadvantaged groups. Moreover, all the food that will be produced during the proposed action will be for participants' consumption. The project will include 60 participants, long-term unemployed social care and assistance beneficiaries.

### **Conclusion**

The Faculty of Agriculture in Osijek has a positive experience of introducing the model of urban agriculture through a number of implemented projects. In accordance with the high-quality results, the Faculty is making efforts to promote the results achieved. Also, through initiating new projects, it drives scientific research necessary for the quality and argued promotion of the model of urban agriculture than can be applied in both urban and rural areas. In recent years, more and more city majors recognize this model of local food production as a concept for organizing public works for taking care of neglected local public land, all the more so as its application brings about additional effect - the production of food for the social categories of the population.

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