BUILDING THE RESILIENCE OF CROATIAN AGRICULTURE TO ENVIRONMENTAL AND ECONOMIC SHOCKS

IZGRADNJA OTPORNOSTI HRVATSKE POLJOPRIVREDE NA EKOLOŠKE I EKONOMSKE ŠOKOVE

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Summary

*This essay summarizes the research and recommendations resulting from a Sustainable Food and Farming project in Koprivnica, Croatia, in the spring and summer of 2014.***1** *A collaborative effort between researchers at Arizona State University and scholars, government officials, business leaders, farmers, and other stakeholders in Koprivnica and the larger Podravina region, this project assessed the historical foundations and current conditions of the local food and farm system and made recommendations for how to build resiliency and sustainability into that system over the next 30 years. Developing a sustainable local food system involves far more than good farming with strong environmental protection measures; it includes considerations of quality of life, the economics of the food system, policy and governance, cultural heritage, and social justice. We start by characterizing the contemporary food system sustainability challenges in Podravina; then we assess obstacles and opportunities for building a sustainable and resilient farm and food system in the region; and we end with practical recommendations for strengthening sustainable farming and food systems in Koprivnica-Križevci County and the broader Podravina region.*

Key words: Sustainability, sustainable agriculture, farm policy, resilience, food systems, Croatia, Koprivnica

Ključne riječi: održivost, održiva poljoprivreda, politika poljodjelstva, otpornost, sustavi hrane, Hrvatska, Koprivnica

INTRODUCTION

As we sat with the Popović family following a tour of one of their farm plots, they brought out a diverse procession of fresh foods, homemade treats, and at least two types of šlivovic, a plum-based homemade brandy—of course, it is culturally offensive not to partake, even when conducting business. The checkered backdrop of fecund garden plots, as well as this family's seemingly inexhaustible generosity, stood as a potent irony as we discussed the apparently ill-fated outlook for their farm. Once everything was laid out on the picnic table, our discussion began, intermittently between nibbles and sips.

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After thirty years of operation, the end of the Popović's farming lifestyle is in sight. Despite planning to grow enough produce to supply the local markets, they are unable to sell all of what they grow. The family cannot make use of their excess production and cannot make a good living with what they do sell. Like good neighbors and generous citizens, they donate the remainder to Red Cross. While some farming operations have the ability to make products like jams or cheeses, the Popovićs lack the time, money, and skills to pursue value-added products. Unfortunately this also eliminates a potential source of income. Some members of the family have other jobs to supplement their farming income—they are unable to support themselves on the revenue from farming alone.

These economic difficulties are widespread in the region, and have implications for local citizens purchasing fresh fruits, vegetables, and dairy products as well. When faced with the choice between mass-produced imported produce and sometimes more expensive local produce, many simply cannot afford the extra expense. With the expectation that the low prices of imported vegetables will undercut the local producers, the Popović's view of the future is not optimistic. With her chin in her worn brown hands, the matriarch of the family explains that she now encourages her two daughters to perform well in school, rather than raising them to follow in her footsteps—she wants them to have a better, easier life. As the two young girls assist in translating our discussion with ease, we have no doubt that they are well on their way to successful careers outside the farm.

Our discussion of measures the family is taking to adapt to climate change was a short one; any adaptations would require additional financial investments. In the view of the Popovićs, who are already straining their financial limits, climatic impacts would simply mean an even earlier end to their farm than they had intended. The general mood of the family is one of resignation, though accompanied by a cautious feeling of hope for their children.

This is an example of one family's experience with the underlying threats to the resilience of agriculture in Croatia—and there are a number of threats converging. Croatia is still recovering from the global economic recession following the 2008 financial crisis. While even the most stable economies were impacted by the recession, the ability of Croatia to cope with the downturn was inhibited by unresolved administrative and infrastructural issues remaining from the previous transition from a centrally planned economy to a market economy, which took place in the early 1990's. In addition, the emerging agro-economic transition resulting from EU accession is likely to further exacerbate instability, making farming an economically unreliable choice for farmers responsible for supporting their families.

As the above account demonstrates, younger generations will leave rural areas to pursue education and higher wages with increasing frequency. Not only does this threaten the demand for local produce, it also means that there is no sustainable source of farming labor, and fewer people to continue farming traditions. The farming population is aging due to the decreasing attractiveness of the farming lifestyle. Rather than barely subsisting through farming in rural areas, younger generations move to Croatia's capital Zagreb, or other urban areas, to attend school or find employment in a more secure sector.

As a long-standing tradition, farming is culturally significant in Croatia, with many traditions surrounding the production and consumption of food. Farmers take pride in providing healthy food, and the population of Koprivnica knows the value of locally sourced products. Food brings people together; families farm together, the community convenes at open-air markets, and heritage foods are a key part of local festivals. The decrease in, or even loss of, farming practices is more than just an economic transition; it portends the loss of customs that shape the lives and identities of members of farming communities, beyond just those who engage in farming activities. Finding ways to sustain the viability of farming in the Koprivnica region would promote not only economic security but also political stability, cultural vitality, and psychological and social well-being.

With so many factors contributing to this food systems sustainability problem, and so many stakeholder groups, solutions are complex and elusive. Our guiding challenge for this research project in Koprivnica was to develop a practical, locally implementable strategy for building and maintaining a sustainable, socially responsible food and farming system in the face of globalization, declining rural population, Croatia's accession to the European Union, and climate change challenges. Developing a

sustainable agricultural model involves far more than good farming with strong environmental protection measures; it includes considerations of quality of life, the economics of the food system, policy and governance, cultural heritage, and social justice. Only the integration of all of these will achieve sustainability in the long term. The EU Commission recently proposed a similarly comprehensive strategy for »smart, sustainable, and inclusive growth« in its *Europe 2020* report (European Commission, 2010). Because sustainability solutions must be complex and integrated, this study places food and farming into its larger social, economic, political, and cultural context, suggesting that policymakers should focus on agriculture at the local level to support economic and social resilience at the local *and* national levels in preparation for climate change, globalization, and economic shocks.

FOOD AND AGRICULTURE PRODUCTION IN PODRAVINA—HISTORICAL CONTEXT

Podravina stretches from the Drava River lowlands in the north and east to a series of gently rising uplands to the south and west. The soil is deep, fertile, and relatively easy to cultivate. Koprivnica is the most populated part of the Podravina region and the most suitable location for farming at about 140 meters elevation along Koprivnica creek. It is located just 92 km from Zagreb, 269 km from Budapest, and 339 km from Vienna, providing many commercial opportunities. Many other towns and villages are scattered across this verdant landscape of farms and forests (Kurtek 1966, 116-117; Feletar 1990, 11-18).

Written records of agricultural production in the region exist from the 17th and 18th centuries, documenting a wide variety of grains produced and traded as well as meat, bacon, flour, garlic, butter, honey, wine and brandy (Petrić 2005). The grains cultivated in the Koprivnica region included rye, wheat, barley, millet, sorghum and buckwheat (KCA, CCR). In the 17th and 18th centuries, several new world crops joined these traditional European crops. Corn was introduced to the Slavonian Military Border region in 1612 and to the town of Koprivnica in 1617, but it did not gain importance as a major commercial crop until much later in the century (STLA, Militaria, 1612, 1617). From the mid-18th century onwards potatoes, tomatoes and peppers also appeared in the crop mix and became increasingly prominent over time. In addition to commercial food products, locals grew many common vegetables in kitchen gardens, such as onions, garlic, kale, Brussels sprouts, cabbage, broad beans (v*icia faba),* green beans, peas, carrots, turnips, pumpkins, and beets. Poultry and dairy products were common, too, including cheese (fresh, dried and smoked); cream (sweet and sour) and butter. Sunflowers were grown for food, oil, and poultry feed. Pork meat was smoked in the attic and pig fat kept in earthen jars and wood buckets. In addition to food products, flax was quite popular for weaving cloth and pressing oil from the seeds. Clearly this region has enjoyed a long and richly diverse commercial and subsistence farm economy (KCA, CCR).

During the 18th and especially the 19th century, the countryside in this part of Croatia witnessed a characteristic transformation from late feudalism into new, capitalist relations. It was also marked by a productive and organizational transformation of farming in general. Although corn was grown in the Podravina region as early as the 17th century, it became dominant only in the 19th century, along with potatoes and a strengthening of cattle breeding, which together significantly increased agricultural production and economic and demographic growth in Podravina. A 3-crop rotational system of tillage with extensive periods of fallow dominated farming into the 19th century, but as the new capitalist-state relations emerged, duties and taxes on farmers significantly increased leading to more commercial production and less fallowing of croplands. Despite this general economic growth, the living standards of the population of Koprivnica and its surrounding agricultural villages remained poor. Farm economics remained at the subsistence level for most people, with just enough crops offered for trade to pay taxes (KCA, CCR).

Towards the end of the 19th century, wheat, corn, and potatoes increasingly dominated the crop economy (Gabričević 1977). The old traditional grain cultures such as rye, meslin, millet and buckwheat, quickly declined in importance. The commercial sale of wheat in particular provided one of the main sources of cash for taxes and other purchases for rural households. In fact, farmers often sold their wheat

while eating corn bread at home (KCA, CCR). The School of Economy and Agriculture, founded in Križevci in 1860 (Seleš 1985), provided a major boost to wheat yields as well as total agricultural production in Podravina. However, poor soil management, weak labor and market organization, inadequate financial resources, and other factors led to very low average crops yields and the continued dominance of autarkic (subsistence) farming (Feletar 1988).

For centuries, orchard and vineyard fruits and nuts have comprised a significant part of the subsistence economy and a small part of local/regional trade networks. There is great potential for expanding fruit production. Nineteenth-century Koprivnica records show that the most common fruits were apple (*ječmenika* red, and *zelenika* green varieties etc.), pear (*tepka* variety and others), plums, rowan, cherry, walnut, chestnut, peach, and currants. Some fruits were used to make brandies. Several wine grape varieties were cultivated, too. The idyllic slopes of Kalnik and Bilogora and hilly parts of the southern and western suburbs have long been used for viticulture. Attesting to the importance of this craft, Koprivnica town administrators leased a wine cellar in the mid- 19th century and the records of 1854 mention vineyard guards (KCA, CCR). Unfortunately, like much of the rest of Europe, wine production in Podravina experienced a deep crisis in the second half of 19th century due to the epidemic grapevine disease phylloxera (Gospodarski list 1880, 124).

With new phylloxera-resistant rootstock available in the 20th century, viticulture experienced a revitalization. Many urban families acquired household vineyard and orchard cottages (small wooden shacks) in the foothills surrounding the towns that served both as a supplemental source of sustenance and as a resting place for older folk who could no longer work hard in the fields. These establishments are the foundation of a thriving informal viticulture community today (KCA, CCR). These quiet rural vineyards and orchards also provided artistic inspiration for self-taught artists of the naïve art style, such as Koprivnica's famous Mijo Kovačić (http://www.mijokovacic.com/biography/).

Industrial agriculture came to Koprivnica in the early 20th century, in part stimulated by World War One, but the villages surrounding Koprivnica remained largely outside the scope of intensive technical progress until the food company Podravka developed after World War Two. Likewise, until the second half of the 20th century the cultivation and care of livestock was rather inefficient, even though improvements in breeding and production began in the late 19th century. The exception to this was horse breeding. Because people used horses for work and for transportation, efforts to improve horse breeds accelerated in the late 1700s and early 1800s. Well-developed horse breeding in Koprivnica was mentioned in 1817, and in 1865 the town gave prizes for breeding success (KCA, CCR).

One of the most important developments of the 20th century in the agricultural economy of Koprivnica and its surrounding region was the rise of agricultural cooperatives. The predominance of relatively small, dispersed farmsteads stymied technological advancement, organization, and efficiency, and cooperatives were an alternative to land consolidation as a means to overcome this limitation. The first cooperatives in the area began in the late 19th century and then grew significantly between the two world wars, helping Podravina to become one of the most advanced agricultural areas of Croatia (CNA).

After the World War Two, under socialist rule, a policy of protecting family farmers from dispossession due to land consolidation strengthened this trend toward cooperatives. A new rule was introduced that prevented one family from owning more than 10 hectares of farm land. On the one hand, this limited the ability of farmers to gain economies of scale in their production, but on the other hand it preserved the family farm as well as traditional polycultures and biologically diverse crop systems (CNA).

More industrial forms of agricultural production came to the region in the 1970s with a consequent decline in crop diversity. During that decade, the Koprivnica region had 32,000 hectares of sown land; 41% of corn, 31% of wheat, and 28% of all other cultures—mostly potatoes and fodder crops. Hence, in just a few decades the once widespread production of rye, barley and oats had severely declined, replaced by a handful of monocultures (Archive of Croatian Bureau for Statistics). The predominance of cereals in crop production is characteristic for regions neighboring Koprivnica, too. Despite the predominance of grains, vegetable production on small private peasant properties remained poly-cultural because every

household with corn and wheat continued to grow a dozen or so other species of vegetables and fruits intended for their own household needs (Feletar 1973).

As mentioned above, the growth of cooperatives and increasing agricultural efficiency in the first half of the century led to a full-scale transformation of agriculture in Yugoslavia after the Second World War, facilitated significantly by the corporation Podravka through a socially owned factory system called *socialist workers' self-management (*CNA).

Podravka controlled 7% of arable land in the Koprivnica region, while the rest was owned by small individual farmers. Consequently, the company organized purchases of agricultural products from private producers and their cooperatives. This especially intensified at the beginning of the 1970s. A comparison of the data on agricultural products purchased by Podravka from private farmers from 1967 and 1976 shows that in those nine years, the purchase increased six-fold (Feletar 1980).

The close connection between the food industry and private farmers created a large number of purchase agreements with individual farmers holding subcontracts for their produce. The volume of subcontracts peaked in 1971 when 5,121 individual households had cooperative purchase agreements with Podravka. At that time the Podravina region had a population of some 60,000 inhabitants. By 1981, the number of subcontractors was reduced to 3,031 families, and in 1988 this declining trend continued with the number of family subcontractors at only 2,385 (Podravka company archive).

After 1990, Yugoslavia broke apart into separate republics and neoliberal capitalist policies replaced the socialist cooperative economy. A steady decline in agricultural productivity and livelihood sufficiency ensued. Podravka's agricultural production operations were spun off into a separate company, privatized, and eventually went bankrupt. For the food processing side of the business, Podravka's well-developed cooperative relations from the socialist period closed down as the company increasingly bought its raw food products from the cheapest sources, which often meant purchasing produce from the EU and China rather than supporting local and regional farms (Podravka company newspaper).

This caused a dramatic shrinkage of the local farm economy and is at the heart of the sustainability, resilience, and livelihood sufficiency challenges the region now faces. While Podravka continues to acquire most of its raw materials from agricultural areas outside of the Podravina region, there is recent interest in revitalizing the regional farm economy and re-activating farm marketing cooperatives to provide more of Podravka's raw materials for its processing facilities (Podravka company archive; http://www.podravka.com/).

BARRIERS TO RESILIENCE

A research team of eight post-graduate students and two faculty members from Arizona State University (ASU) traveled to Koprivnica in Summer 2014 as part of the Walton Sustainability Solutions Initiatives. Two of the authors of this essay, Barry and Hirt, were part of the ASU team. We began our research with the knowledge that small-scale agriculture at the local level was suffering. The goal of our work was to determine the causal factors at play in its breakdown, to assess opportunities for improvement, and to communicate these results to our partners and stakeholder groups. Two weeks of fieldwork with farmers and municipal administrators was conducted in the town of Koprivnica, after which co-author Megan Barry conducted additional research on macro-level policy issues through interviews with experts in Croatia's capital Zagreb, as well as EU researchers outside of Croatia. From this work, we developed a strategic plan for a sustainable farm and food system in Koprivnica.

Interviews allowed us to interact closely with participants and understand how stakeholders comprehend and respond to sustainability challenges. The majority of interviews with farmers were conducted on their farms, providing valuable context into their lives and work environments. Farmers' sense of pride, attachment to the land, and comfort with farming was clearly evident as we walked through rows of peach trees and heads of lettuce, or picked cherries from the trees as we spoke. The size of farm plots is a complex variable in the discussion of resilience. Many of the farmers we interviewed felt that the size of plots was too small for them to produce enough to make an adequate living. One peach farmer in

particular, our self-identified »euroskeptic,« felt that the small sizes of farming plots hindered his ability to compete in the larger European market. As of 2010, about one half of all farm holdings in Croatia were less than two hectares, while the average size of farms throughout EU-27 at this time was 14.4 hectares (Eurostat, 2013).

Alternatively, plots can also be too large. The largest plot of any farmer we interviewed was seventy-five hectares –with forty-five hectares being his own land, and the rest being provided by the state for him to cultivate. He produced primarily corn and wheat with a target market of larger commercial vendors—his produce was not for the consumption of the local population. While he was more optimistic about his ability to compete in a larger market, the only way he could do so was to mass-produce a less diverse selection of crops than is typical of the region. From a perspective of agricultural resilience, this is rarely conducted in a sustainable manner as it is usually chemical-intensive monoculture farming that contributes to the depletion of soil nutrients, water pollution, and unintended negative impacts on ecosystems and beneficial species like honeybees (Tilman et al, 2002). In addition to the negative impacts on ecosystems, monoculture farming makes it far more difficult for the population to meet much of its food needs from local sources. Of the 79,000 hectares of agricultural land available in Koprivnica-Križevci County, where our interviews were conducted, only 574 hectares are used for vegetable production, while the majority is wheat and corn. If more of this land was devoted to diverse crops, the population would have a more reliable regional food supply in the future.

The size of farm plots is connected to another aspect of sustainable agriculture: the dependence on chemical inputs. Among farmers that we spoke with, the use of fertilizers and pesticides was not uncommon, and according to members of Podravka, globalization has been increasing the pressure to use these chemicals locally. In terms of pure agricultural resilience, these management practices are not ideal. While chemical inputs can increase crop production, they also increase nitrates and toxins in surface ground water (Tilman et al, 2002, Horlings and Marsden, 2011). It can also lead to negative consequences for human and environmental health in the long run, and this clearly has implications for the general population as well, beyond just farmers and their families. Croatia enjoys relatively high environmental quality, but that may be compromised by the increased use of agricultural chemicals as farm sizes increase. Given the significant economic opportunities afforded by Croatia's reputation for environmental quality, the damages associated with extensive and repeated use of pesticides and fertilizers should be avoided.

It was rare in our interviews to see people younger than 40 engaged in farming activities. One younger farming couple, new to the practice, inherited a farm and began to explore the potential to produce organic crops for local markets. Aside from this one example, the majority of farmers were older. Producers with younger children were often not actively passing on farming skills and practices to their children, with the understanding that, like the Popović children, their offspring would be leaving the farming tradition. If the farming population ages without the incoming younger generation to maintain the tradition, imported products from the European market will likely fill the gap locally. The benefits of local agriculture for small communities will be lost.

A contributing factor to the aging population on farms is the fact that farm incomes are both inadequate and unstable. The majority of interviewees were unable to survive solely on farming and had to supplement their incomes with other occupations, either personally or through the contributions of their extended family members. In a discussion at the local farmer's market, the market organizer stressed that they had not raised the cost of renting booths for ten years in order to encourage maximum farmer participation—one of the main obstacles in getting more farmers to sell at the market is the fact that farmers cannot be certain of a return on their investment. Without a bulk vendor or wholesale purchaser, there is no guaranteed income from week to week, since it cannot be guaranteed that one's produce will sell at the local markets. The occupation of farming is also uncertain by nature – with no pun intended. Not only are prices unknown and unstable, but a change in any agricultural input – with climatic factors being one of the most obvious variables – could result in a crop failure. In a country where agriculture comprises much of the livelihood activities, if those employed by it are fairing poorly, the rest of the economy suf-

fers as well. It is no wonder that younger generations, like the Popović children, see the struggles of their parents and want to turn to an occupation with more economic stability.

In general, many of these issues, which are common to small-scale agriculture in general, are manageable with sufficient social and policy support. Unfortunately, in Koprivnica it was clear in many cases that a lack of local capacity and limited farmer understanding of policy options inhibited the ability of farmers to achieve greater wellbeing. During our research we sensed uncertainty about where funding for agricultural activities came from, and whose policies were being adhered to, Croatia's or the European Union's. According to multiple policy experts that we interviewed, this may be in part because the agri-policy goals often do not match the real priorities of farmers, which in turn makes the policy goals unclear to stakeholders. On this topic, one of our farmer interviewees commented that they [farmers] were already marginalized in terms of representation, and it was his expectation that the situation would worsen as Croatia further integrates with the EU, and becomes marginalized itself, with »everything coming from Brussels« (Personal communication, 2014).

This issue is closely related to the impact that the lack of organization has on the local agricultural markets. Among farmers, there is a lack of trust that keeps them from organizing and communicating effectively with each other. This is a problem for value-added products in particular. We interviewed a beekeeper who noted that a lack of cooperation made it very difficult for value-added producers to compete in larger markets; they produced too little alone be able to sell successfully in the EU market. The peach farmer we interviewed suggested that he would consider value-added products, but only *if* there were cooperative organizations that provided opportunities and resources, such as in the form of joint facilities for processing, or collection points to facilitate distribution. He stated that there were existing cooperatives for communication and publicity, but not to directly facilitate the kinds of coordination that would truly make a difference. Interestingly, both farmers and policy experts attributed the failure to organize to the fact that prior to Croatia's transition to a market economy in the 1990s farmers were accustomed to a central authority providing market coordination and regulation functions. Too many farmers still expected the state to monitor production and guarantee prices, and were not prepared for the transition to less regulated markets (Franic and Mikuš, 2013). This mentality still persists in some form today.

OPPORTUNITIES AND REASONS FOR OPTIMISM

Despite these inhibiting factors, there are many reasons to be hopeful about the future of farming in Croatia. A number of opportunities can be leveraged to promote success in the future. For example, one policy expert, Dr. Ornella Mikuš of the University of Zagreb, noted that Croatia is environmentally rich, with high quality land, water, soil, and air. Environmental conservation has been a national priority historically, and continues to be a priority for future development (World Bank, 2014). There is an abundance of agricultural and forested land; as of 2013, Croatia had 874,276 hectares of arable land (Croatian Bureau of Statistics, 2013). In comparison to other EU member states, its utilization of agricultural land is relatively low, however, averaging 20-40%, while other nations like France and Germany use more than 60% (Eurostat, 2014). Not only is Croatia's verdant landscape beneficial to agricultural resilience, but it provides the foundation for a number of additional economic opportunities. Croatia has many crops and specialty food items that could be marketed as heritage products for tourists. Examples include wines, cheeses, pršut (prosciutto), honey, and pumpkin seed oil, an artisanal product that we saw—and ate—quite frequently during our stay in Croatia.

Agro-tourism was a frequent topic of discussion during our research, despite the fact that there is currently no direct funding for farm tourism at the national level (Demonja & Baćac, 2012). The popularity of agro-tourism has increased slowly but steadily, and it is a viable sector to create opportunities for rural development and to supplement farm income. In addition to providing supplemental income to family farms while preserving the local heritage, agro-tourism opens the door for a new view of the family farm and offers an attractive opportunity for young people to return to the farms. By 2007 the total number of registered tourist rural family households in Croatia was around 352, with the highest registered members

in the counties of Dubrovnik-Neretva and Istria—which is to be expected as these are the very popular coastal tourism areas of Croatia. However, as of 2009 some agro-tourism was found in eastern Croatia as well, according to the Ministry of Tourism, with four agro-tourism sites located in the Koprivnica-Križevci County where we conducted our research (Croatian Ministry of Agriculture, Fisheries and Rural Development, 2009).

When we asked interviewees to consider potential problems for the future, climate change and extreme weather were mentioned more frequently than we expected, and, we suspect, more frequently than these topics would be mentioned by farmers in the United States. The potential negative impacts of climate change aside, Croatian farmers' awareness of climate change impacts on the horizon is encouraging. Many of our farmer interviewees acknowledged that they have already seen significant climate change affecting their farming during their lifetimes. One couple has already begun preparing, going as far as choosing a climate resilient crop, the Jerusalem artichoke, to protect the stability of their income source. Another farmer, with a fruit tree orchard, not only uses nylon mats to protect his crops from hail, but also has a climate station that measures temperature and moisture. These examples indicate a willingness to consider and implement adaptation measures. However, farmers indicated that they cannot prepare to the desired extent due to the expenses associated with adaptation.

Despite difficulties with communication and collaboration between local institutions, local administration, and farmers, there *is* a notable amount of town-level financial support in Koprivnica. Many farmers mentioned receiving town support in the form of direct payments—usually a per-hectare payment. The City Economic Department told us of their support for rural development measures, with examples such as the provision of greenhouses, which encourage longer growth seasons as well as participation in a community garden by interested community members lacking their own farm plots. There are also classes that teach, for example, about activities like beekeeping. A beekeeper we spoke with explained that the beekeeping school, now in its fourth generation of students, receives a 40 percent subsidy from the town to help alleviate startup costs, and that professors from Zagreb University travel to Koprivnica to teach the trade. As opposed to providing only a direct payment, this strategy in particular builds knowledge and skills, giving farmers and non-farmers alike the ability to take initiative and to have more control over their livelihood activities.

There are an even greater number of farmers taking advantage of national financial support. As mentioned previously, Croatia provides state land to increase the size of farms; a dairy-farming family interviewed for this research received both land and cows for their production. Our peach farmer benefited from national support when the Ministry of Agriculture purchased all of the plants he needed to start his farm in 2003. He and his wife continue to receive support for planting in the form of tree seedlings from a nursery.

In addition to financial support at the local and national levels, there is significant social support for farming, and values that are conducive to the longevity of small-scale farming in Koprivnica. Consumers that we spoke with at the local market clearly preferred local produce to generic corporate produce, saying that knowing both your producers and the conditions in which your food is produced is a guarantee that your food is »real and natural.« As children ran around the playground at the farmer's market, parents cited the health of their family as an important reason for buying local. In addition to the local open-air markets, it is common for consumers to go directly to the houses of farmers and producers to buy from them directly. This finding was supported by interviewee Dr. Mikuš, who indicated that the demand for local and organically produced goods is increasing throughout all of Croatia. Freshness and variety of produce are qualities that consumers have come to value and expect nationwide.

In terms of existing infrastructure, one of our primary collaborators in Koprivnica was Podravka, the previously mentioned food processing company, which had employed much of the town's population in the past. Podravka was a frequent topic among farmers; many of them previously employed by the company before turning to farming. Only a few farmers now sell their produce to Podravka for processing. One benefit of companies like Podravka for this particular municipality, and for many other areas of

Croatia, is that the associated infrastructure, networks, and supply chains can be leveraged and expanded upon moving forward.

Podravka hopes to serve as a source of innovation in Koprivnica. They are developing a Center of Competence, and through this they hope to facilitate the transition to an agricultural model that integrates consumer values and farmer needs. This innovation is representative of a larger trend of increasing research on agricultural resilience in tandem with Croatia's recent accession to the European Union. Prior to the early 2000s, there was not enough support for this sort of research, but state funding for sustainable agricultural development and scientific research has increased over the last decade (Mikuš et al, 2010).

In addition to an appreciation for heritage foods and farming traditions, farmers young and old are intrigued by opportunities like value-added production and expansion to the EU market. Interviewees provided an extensive list of desired tools and funding needed for success along these lines. For example, one community gardening NGO expressed the desire for additional plots of land, a tool shed, and a playground to serve the dual purpose of increasing the number of families participating as well as incorporating farming into the lives of children. The previously mentioned farmers of Jerusalem artichokes expressed the desire for an irrigation system and a tiller for the same reason that the majority of interviewees wished for mechanization and tools: they want to scale up production sustainably in order to penetrate the larger EU markets.

In terms of agricultural resilience, the tradition of a small farming regime in Croatia can also be framed as a strength. Small farms inhibit corporate land consolidation and small farmers are more likely to be better land stewards (D'Souza and Ikerd, 1996). As previously mentioned, the plots in Koprivnica, averaging about five hectares according to the City Economic Department, are currently not large enough for most farmers to produce enough to support themselves and their families. This could change, however, if municipalities and farmers in Croatia were to strengthen cooperatives and take advantage of particular funding schemes provided by the European Union.

The EU offers many mechanisms to support small- and mid-sized farms. Most of these measures were not fully in effect in Croatia yet in 2014, but are in transitional stages as the state only joined the European Union in 2013. Fortunately, in joining the EU, Croatia has become subject to its Common Agricultural Policy (CAP), which underwent revisions in 2013 to safeguard against many of the more problematic agricultural impacts of EU accession. One of our interviewees currently benefitting from EU funding is the larger-scale farmer of corn and wheat, previously mentioned, who receives 200 euros per hectare for his farm. The majority of other farmers interviewed for this research were availing themselves of national and local level support. However, as the accession process progresses, national funding will be phased out and replaced with EU funding. When combined with increasing communication and knowledge about funding opportunities, the number of farmers receiving EU support should increase.

SWOT Analysis:

In order to process and condense the results of interviews conducted with farmers, policy experts, and academics, we conducted a SWOT analysis, which consists of a consideration of **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats to the current agricultural system. Below is a chart that organizes interview responses into the SWOT categories. Many of the responses of participants—farmers, academics, and policy experts—echoed the findings in existing literature. This suggests that these particular issues are persistent and require attention. However, there were many instances where responses provided new insights. The chart below is a condensed and more comprehensive collection of the SWOT factors discussed in the narrative above.

Strengths	Weaknesses
Environmental	**Economic**
High water quality	Local markets more expensive than supermarkets, fewer able to buy local
High land quality	Prohibitive cost of mechanization
High soil quality	Prohibitive cost of climate adaptation
Promotion of organic farming	Instability of income
Access to both state-owned and private agricultural land/ forests	Pre-existing economic downturn
Legislation regulating pesticides	Negative agri-food trade balance
Policy EU-level:	Pressure to specialize
CAP goal of stability, health, and affordability	Local market flooded
CAP update theme of climate resilience	**Environmental**
International consensus on importance of sustainable agriculture	Use of pesticides and fertilizers
Rural Development Program to support small-scale farming	Inability/failure to adapt to climate change
Policy National-level:	**Sociocultural**
Pre-existing national insurance scheme	Ex-socialist dynamic (people more inclined to follow than innovate), lack of trust in others
Sociocultural	Disorientation with modernization of technology and IT
Awareness of coming changes, amongst farmers and organizations	Lack of understanding and awareness (in emerging opportunities, environmental integrity, clarity of policy goals)
Pre-existing organizing structures (effectiveness questionable)	**Infrastructural**
Pre-existing social support for local agriculture	Size of farms too small for value-added market
Genuine enjoyment in farming, persistence	Size of farms too small to penetrate international market
Preference for locally-sourced products	Fragmentation of farm plots
Infrastructural	**Administrative**
Pre-existing food processing industry	Slow payment/return when selling to larger vendors
Administrative	Ineffectiveness of cooperatives, lack of organization amongst farmers
Payment plan to ease cost burden of selling at local markets	Lack of collaboration and communication *among and between* stakeholder groups
Increasing amount of research in environmental quality and agricultural economics	Too much administrative burden, logistically and economically

Opportunities	Threats
Economic	**Economic**
Agro-tourism	No funding for farmers to lobby at EU-level
Value-added products	Undercutting of local market by less expensive imported food
Farming as alternative for unemployed and younger generations	Prohibitive start-up costs for niche markets
Environmental	**Environmental**
Developing agro-environmental alternatives to pesticides	Climate change
Utilizing fragmentation of farms to build climate resilience*	Globalization impacts (monocultures, disease, increasing non-organic practices)
Interest in organic/sustainable	**Sociocultural**
Policy EU-Level	Aging farming population
Funds for younger generations	Desire for children to leave farming industry
Funds for Less-Favored Areas*	Depopulation of rural areas
Funds for climate adaptation	Lack of collaboration and communication *among and between* stakeholder groups
Funds to preserve environmental and cultural integrity	Lack of knowledge and awareness (in emerging opportunities, environmental integrity, clarity of policy goals)
National-level flexibility for allocation of EU funds	**Infrastructural**
General	Size of farms too small to penetrate international market
Availability of subsidies	**Administrative**
Desire to incorporate stakeholders	Lack of research (monitoring, mapping, evaluation)
Sociocultural	Ineffective channels for stakeholder representation
Desire for organization and support (cooperatives)	
Desire for knowledge	
Development of Center of Competence**	
Valuing healthy sustainable food	
Infrastructural	
Beneficial modernization and adaptation	
Desire for mechanization	
Administrative	
High administrative potential, large number of municipalities	

DISCUSSION AND RECOMMENDATIONS

The following recommendations for how to foster the resilience of Croatian small-scale agriculture to environmental and economic shocks are drawn from stakeholder interviews, scholarly literature, and EU policy documents.

Support to Small-Scale and Young Farmers

Two of the more worrisome trends identified through this research are 1) the inability of smaller farms to compete in the larger EU market, and 2) the outflow of younger generations to less rural areas of Croatia. While *some* farmers in Koprivnica were availing themselves of EU Common Agricultural Policy funding, it was relatively few in comparison with those benefitting from national support. As previously mentioned, this number will increase over the next few years, with many potential benefits. The objectives of the 2013 CAP update include »viable food production,[2] sustainable management of natural resources, and climate action and balanced territorial development«[3] (European Commission, 2013). All of these objectives suggest that EU policymakers are aware of and seeking to address concerns about the economic outlook of small-scale farmers and the aging of the farming population.

The Common Agriculture Policy traditionally structures the provision of funding into two pillars: the first pillar provides direct payments to farmers, while the second offers support programs for rural infrastructure and eco-farming. The updated CAP maintains these pillars, but also increases the link between them. There now exists flexibility in how each European Member State can apply funds under the Common Agricultural Policy, with allocation to »depend upon the choices made by Member States« (European Commission, 2013). To provide an example of this flexibility in action, in November 2013, the German Ministry of Agriculture unanimously agreed to provide additional support to small and medium-sized farms, while providing less funding to larger producers. Small farmers would receive an additional 50 euros per hectare for the first 30 hectares of land. A similar measure is being taken with younger farmers under 40 years of age now receiving an additional 50 euros per hectare, limited to the first 90 hectares of land per owner and for a maximum of five years (Euractiv, 2013).[4] In the effort to support small-scale farmers, as well as ensure continuing interest from younger farmers, Croatia could consider implementing similar measures to prioritize and target their spending as they feel best suits their unique priorities (European Commission, 2013). For families like the Popovićs, the implementation of this funding scheme could make all the difference. The knowledge that their children could qualify for additional support, for both the size of their farm and for their younger age, might encourage the family to stay in the farming business, with the hopeful prospect of prosperity rather than hardship.

Facilitating Collaboration

As previously alluded to, a common concern in farmer interviews was a lack of collaboration and trust among themselves, and a desire for increased cooperation. The CAP update specifically outlines measures that can be taken to facilitate collaboration among producers and improve the competitiveness of farming by »reducing costs, improving access to credit and adding value to the primary sector« (European Commission, 2013). Increasing collaboration would have two benefits. A number of farmers interviewed for this research indicated that they did not pursue activities like value-added processing because they could not afford equipment on their own. Croatia is fortunate in that a very wide variety

[2] In the context of CAP, viable food production includes environmental sustainability, but also competitiveness, innovation, and food chain functionality.

[3] In the context of CAP, balanced territorial development refers to the efforts to facilitate the demographic, economic, and social development of less favored rural areas, which are prone to depopulation.

[4] Beginning in 2015, farmers under 40 years of age entering the sector will be eligible to receive an additional first pillar payment *in addition* to start-up aid under the second pillar (European Commission, 2013).

of fruits—a category including olives—can be produced (Mikuš et al, 2010). Expanding the selection of what is grown, as well as what it is processed into, could open up greater economic opportunities. The ability to create nationally or regionally distinctive value-added products would allow Croatia to be more competitive on an international level.

EU support exists for these products in particular, in the form of Protected Geographical Indication status for specialty products »closely linked to the geographical area« when »at least one of the stages of production, processing or preparation takes place in the area« (European Commission, 2014). Some products within Croatia already benefit from this status, for example »Bregovska pita,« which originates from a particular village, and there is no reason that the same status cannot be achieved for other heritage products.

The use of CAP funds for this purpose would make production of value-added goods possible by facilitating the development of centralized facilities that could be shared by many local producers. A cooperative processing facility would provide valuable options for farmers like our peach grower, who claimed he could not manufacture products like jams because he lacked sufficient capital to build the processing facility. (Coincidentally, Podravka's earliest incarnation before World War Two was as a jam producing facility taking advantage of local orchard production.)

Farmers also indicated that they could not produce a large enough quantity of value-added products to be competitive in the larger-scale export markets. Financial incentives under the second pillar of CAP funding (intended for rural development[5]) would provide support to set up producer groups and collection points, which would improve the functionality of the food supply and distribution chain. It would also increase promotional activities, on-farm processing, and differentiation of products by expanding possibilities beyond raw produce.

Local municipalities can take steps to encourage this type of cooperation through promotion, facilitation, and financial incentives. For example, England has used its Pillar II funding under the reformed CAP to support a number of collaborative initiatives, including the establishment of a »European Innovation Partnership on Sustainable Agriculture,« along with the strengthening of farm advisory services and the funding of cooperative activities to support farmers and rural businesses (Department for Environment, Food & Rural Affairs, 2013). Croatia can take a similar approach, scaling up the role of farm advisory services to create community facilities and machinery and develop collaborative institutions that, for example, facilitate collection of agricultural products for larger markets and purchasers. The proposed Center of Competence in Koprivnica is a perfect example of a blossoming organization that will greatly benefit from the use of these funds and could serve an instrumental role in the future. In terms of resilience, this level of collaboration increases the capacity of rural farmers to adapt to new opportunities and impending challenges resulting from changes in the market and climate conditions.

Agricultural Resilience

Sustainability is an important criterion for the Common Agricultural Policy in stimulating resilient food systems. The Green Payment structure created under the CAP update further rewards farmers for respecting three agricultural practices: (1) Maintenance of permanent grassland, (2) Ecological focus areas, and (3) Crop Diversification (European Commission, 2013). If farmers demonstrate that they are meeting these criteria, they gain access to funds under the Green Payment Scheme. Producers like the young farming couple we interviewed who create their own organic pesticides and use integrated pest management, are examples of practices that are eligible under the Green Payment Program.

The CAP update also includes policies on Green Infrastructure to provide »additional guidance for authorities and decision makers, civil society, private business and conservation practitioners to ensure the full mobilization of ecosystem-based approaches to [climate] adaptation« (An EU Adaptation Strategy. . ., European Commission, 2013). This approach supports agricultural resilience in a way that is sustainable

[5] See Figure 1 of Appendix A for details on EU CAP Rural Development Priorities.

by leveraging the strengths of Croatia's ecosystems.[6] A number of examples of measures that fall into these categories can be found among our interviewees, for example creating organic pesticides, choosing climate resilient crops, and maintaining the traditionally diverse crop selection in Croatia.

Informational and Training Programs

One of the greatest barriers to implementation of rural development schemes is a lack of understanding of what national and international financial support translates to at the local level. An increase in knowledge about how large-scale policy will impact the day-to-day operations of individual farmers would greatly increase the effectiveness and acceptance of these policies. The framework currently used to support programs like the aforementioned beekeeping school could be expanded to include programs to inform farmers about the implications of shifting agro-economic policies. Not only would this alleviate challenges resulting from unpreparedness and disorganization, it would increase awareness of new opportunities when they become available. It is likely that such programs would be eligible for funding under Pillar 2 of the EU CAP update,[7] particularly if they were undertaken in tandem with the development of organizations like Podravka's Center of Competence.

Agro-tourism

Rural tourism is a viable opportunity for rural development (Ammirato & Felicetti, 2013). In the United States, agro-tourism has increased 25 percent over the last five years, generating $700 million in revenue in 2012, and is seen as an important tool for revitalizing rural economies (Frommer, 2014). It can include hospitality, meal provision, farm tours, on-site processing of agricultural goods, pick-your-own crop activities, and more. In addition, it can support the development of other local activities such as nature related tourism, adventure tourism, educational tourism, and cultural tourism (Croatian Ministry of Agriculture, 2009). There are a number of producers interested in the economic potential for agro-tourism, but the necessary investment of both time and money is prohibitive for small family-owned farms.

As a result of EU accession, Croatia will have at its disposal 373 million euros for direct payments to farmers and 330 million euros for rural development projects between 2014-2020. These funds could be used, through the development of agro-tourism, to help co-finance and improve living conditions in the countryside to help keep youth in rural areas. Each approved rural development project can be co-financed with EU funds up to 50 percent, and, for young farmers who have at least five years of experience in farming, EU support can increase to 75 percent (to encourage young farmers). Taking advantage of the co-financing could be a potential approach for farmers to receive enough funding to invest in a new business opportunity to support the diversity of their farms.

In addition to providing supplemental income to family farms while preserving local heritage, agro-tourism can open the door for a new view of the family farm and offer an attractive opportunity for young people to return to the farms. Through a revitalized perspective on farming, rural tourism can integrate individuals to the farming system not only as farmers, but as key actors and cultural heritage experts in the tourism sector. According to Sanda Renko, a professor of economics at the University of Zagreb, a side-benefit of this funding scheme is that it adds to farmers' desire to engage in sustainable practices.

Preparing For Extreme Events

In addition to a new land-based and producer-support approach, one of the most important aspects in the 2013 CAP update is a focus on climate change; CAP seeks to recognize and reward farmers for the positive nonmarket benefits they provide to society, one of which is climate stability. While the Green

[6] For a more detailed visual of the Green Payment Structure, see Figure 3 of the Appendix.
[7] See to Figure 2 of Appendix A.

Payment structure will be beneficial in supporting climate resilience, the CAP update goes further, creating a reserve of EUR 400 million per year to be used to cope with crises. It also provides a risk management toolkit, which includes insurance options for crops and animals. These measures assist in adaptation to a changing climate and are another opportunity for accessing EU funds, but should not be viewed as an alternative to taking preemptive action by maintaining a resilient local agricultural system.

In sum, we recommend that Croatia:

- Provide support to small-scale and young farmers
- Facilitate collaboration and communication amongst stakeholders
- Support activities conducive to agricultural resilience
- Develop informational and training programs for farmers
- Expand agro-tourism
- Prepare for extreme events

Why It Matters

Beginning in September of 2014, with tragically coincidental timing, parts of Croatia were inundated with extreme flooding. Koprivnica-Križevci County, where our farmer interviews were conducted, was one of the most heavily impacted areas, creating a critical situation where a number of villages had to be evacuated. This was the second major flooding event in just four months (Croatia Week, 2014). The Prime Minister, Zoran Milanović, stated that those impacted by the floods should not expect to receive assistance from the government, placing the burden of responsibility on small municipalities.

This example demonstrates the need for strong resilient communities. The idea of resilience necessitates a comprehensive approach, which we have attempted to embody in this assessment by considering the potential economic and environmental threats, and developing a wide range of recommendations. In the simplest of terms, resilience represents the ability for components of a system to continue functioning in the face of challenges.

The lackluster management of economic transitions in the past has left Croatia at a disadvantage, decreasing its ability to cope with the recent recession, as well as events like the extreme flooding described above. As history demonstrates, crises and unexpected system shocks have negatively harmed Croatian agriculture and the economy. The impacts of years of violent conflict during the war for independence in the early 1990s still manifest today, both socially and physically, in the form of shattered buildings and hidden landmines in the countryside. The future may be no less stable. The ongoing process of globalization will contribute to an even more interconnected food system, while population increases will add to the perceived need to mass-produce food. These factors further complicate the unpredictable impacts that climate change will have on Europe.

Groups likely to be impacted by extreme events, whether caused by humans or nature, are communities with low levels of social protection (insurance, health services, infrastructure, etc.), marginalized groups, and those with fragile or inadequate incomes—all factors related to limitations on the capacity to act and adapt, all of them describing the farming population. In developing recommendations, our approach was two-fold. We sought to create a suite of measures that builds resilience through leveraging the many resources that do exist in Croatia, thereby increasing the capacity to act and »own« resilience-building activities locally. However, given the fragile state of the population under consideration, and the strained economic condition of Croatia, external aid is probably necessary and certainly desirable. We have suggested the application of particular policies, many of which include the flexibility to implement them as national and local officials see fit. With the application of these recommendations, it is our hope that families like the Popovićs will be embedded in prosperous communities that have the necessary economic, social, and environmental resources to endure the challenges that the future will bring.

REFERENCES

Primary sources:

1. »Agriculture and Rural Development Plan« (2009). Croatian Ministry of Agriculture, Fisheries and Rural Development. IPARD Programme 2007-2013.
2. »Agricultural Policy Perspectives Brief: Overview of CAP Reform 2014-2020« (2013). European Commission.
3. »Agriculture, Forestry and Fisheries Production Statistics Department« (2013). Croatian Bureau of Statistics.
4. Archive of Croatian Bureau for Statistics, Zagreb
5. CAP Reform in Rural England; Status Report on the New Rural Development Programme (2013). Department for Environment, Food & Rural Affairs.
6. CNA – Croatian National Archives, Zagreb
7. An EU Strategy on Adaptation to Climate Change (2013). European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.
8. Europe 2020: A Strategy for smart, sustainable, and inclusive growth (2010). European Commission.
9. KCA CCR – Koprivnica city archives, City council registers, in: State archives Varaždin.
10. Podravka company archives, Koprivnica.
11. STLA, Militaria – Styria state archive, Graz.

Secondary sources:

1. D'Souza, Gerard and John Ikerd (1996). »Small Farms and Sustainable Development: Is Small *More* Sustainable?« *Journal of Agricultural and Applied Economics,* Vol. 28, 1.
2. Demonja, D., & Baćac, R. (2012). Contribution to the development of rural tourism in Croatia: Proposed steps for successful business. *Turizam*, *16*(4), 134-151.
3. Feletar 1973 – Dragutin Feletar, Podravina, Koprivnica 1973.
4. Feletar 1980 – Dragutin Feletar, Prilozi za povijest Podravke, Koprivnica 1980.
5. Feletar 1988 – Dragutin Feletar, Podravina, Koprivnica 1988.
6. Feletar 1990 - Dragutin Feletar, Geografski položaj i geomorfološko-pedološka osnovica naseljenosti Podravine do kraja srednjeg vijeka, Arheološka istraživanja u Podravini i kalničko-bilogorskoj regiji, Izdanja Hrvatskog arheološkog društva, no. 14, Zagreb 1990.
7. Franic, R and Ornella Mikuš (2013). Chapter 10: Transformations in Croatian Agriculture and Agricultural Policy: Challenges and Opportunities within the European Context, in *Agriculture in Mediterranean Europe: Between Old and New Paradigms (Research in Rural Sociology and Development, Vol. 19)* Emerald Group Publishing Limited,
8. 233-261.
9. Frommer, Frederic J (2014). »Ag Tourism Touted as Way to Boost Rural Economies.« Associated Press.
10. Gabričević 1977 – Ante Gabričević, Pšenica i kukuruz u našoj regiji, Podravski zbornik 3, Koprivnica 1977.
11. Gospodarski list 1880 - Philloxera vastratrix u našoj domovini, Gospodarski list, Zagreb 1880.
12. Horlings, L.G. and T.K. Marsden (2011). Towards the Real Green Revolution? Exploring the Conceptual Dimensions of A New Ecological Modernization of Agriculture that Could »Feed the World«. *Global Environmental Change, Vol. 21,* 441-452.
13. Kurtek 1966 - Pavao Kurtek, Gornja hrvatska Podravina, Zagreb 1966.
14. Mikuš et al (2010). Chapter 4: Review of Agriculture and Agricultural Policy in Croatia, in *Agriculture in the Western Balkans: Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 57.* Institute of Agricultural Development in Central and Eastern Europe, 93-121.
15. Petrić 2005 – Hrvoje Petrić, Koprivnica u 17. stoljeću, Koprivnica 2005.
16. Podravka company newspapers.
17. Seleš 1985 – Josip Seleš, 125 godina poljoprivrednog školstva i znanstvenog rada u Križevcima, Poljoprivredni institut Križevci 1860-1985, Križevci 1985.
18. »Structure of Agriculture in Croatia« (2013), from *Agriculture, Forestry and Fishery Statistics Pocketbook*. Eurostat.
19. Tilman, D. et al (2002). Agricultural Sustainability and Intensive Production Practices. *Nature, Vol 418*. Nature Publishing Group, 671-677.
20. »World Bank Group-Croatia Partnership« (2014). Croatia Snapshot –Country Program Snapshot.

On line resources:

1. »Agriculture Statistics at Regional Level« (2014). Eurostat. http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Agriculture_statistics_at_regional_level#Utilised_agricultural_area
2. http://www.mijokovacic.com/biography/
3. http://www.podravka.com/
4. »Geographical Indications and Traditional Specialties« (2014). European Commission. http://ec.europa.eu/agriculture/quality/schemes/index_en.htm
5. »PM: No State Help for Latest Flood Victims« (2014). Croatia Week. Retrieved November 11, 2014 from http://www.croatiaweek.com/pm-no-state-help-for-latest-flood-victims/

APPENDIX A: EU COMMON AGRICULTURAL POLICY 2013 UPDATE

1. Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas
2. Enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and sustainable management of forests
3. Promoting food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture
4. Restoring, preserving and enhancing ecosystems related to agriculture and forestry
5. Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors
6. Promoting social inclusion, poverty reduction and economic development in rural areas

Figure 1. *CAP Rural Development Priorities*

PILLAR I	TARGETED ACTION	PILLAR II*
Green payment	ENVIRONMENT	Agri-environment-climate Organic, Natura 2000
Top-up payment	YOUNG FARMER	Business development grants Higher investment aid
Top-up payment	AREAS WITH NATURAL CONSTRAINTS	Area payments
Alternative simplified scheme	SMALL FARMER	Business development grants
Improved legal framework	PRODUCER COOPERATION	Aid for setting up producer groups Cooperation and short supply chain

Figure 2. *CAP Pillar Structure*

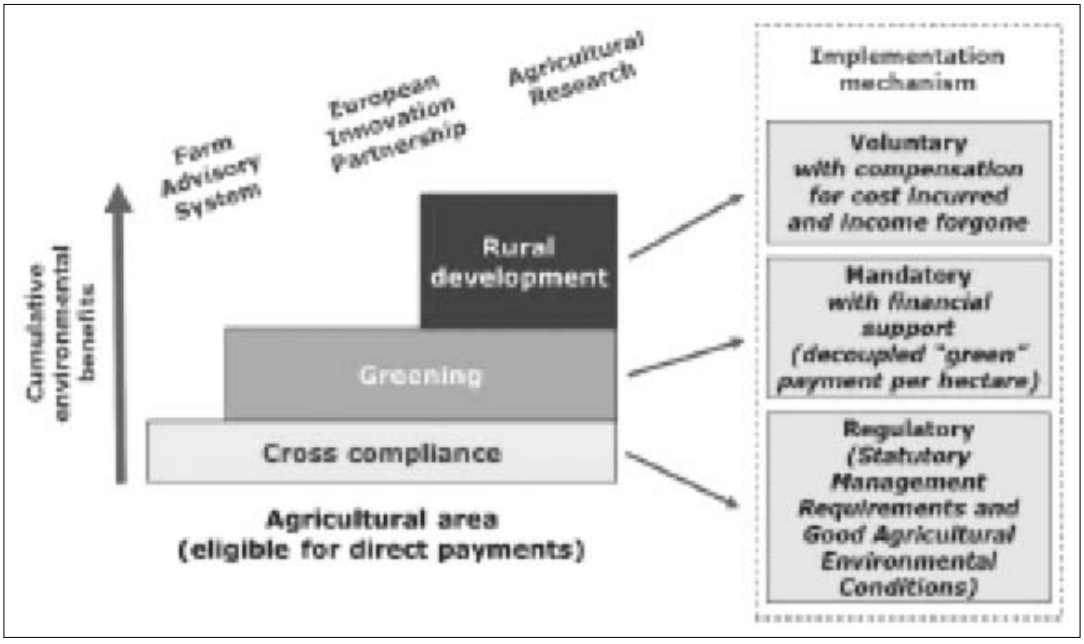

Figure 3. *CAP Green Payment Structure*

APPENDIX B: PROJECT PARTNERS

ASU Participants

1. Lead instructor and project co-director: Dr. Paul W. Hirt, Professor and Senior Sustainability Scholar, Global Institute of Sustainability.
2. Co-instructor and sustainable food and farm consultant: Greg Peterson, green living and sustainability innovator, founder of the Urban Farm in Phoenix.
3. Project assistant: Katie Thompson, ASU student in the Master of Arts in Sustainability program.
4. Megan Barry: ASU student in the Masters of Sustainability Solutions program.
5. Spencer Bolen: ASU student in the Masters of Urban and Environmental Planning program.
6. Mich Lyon: ASU doctoral candidate in Urban Planning and Faculty Associate in the School of Politics and Global Studies.
7. Emmanuel Ramirez, ASU student in the Master of Science in Agribusiness Management program.
8. Daina Rasutis, ASU Master of Science student in Civil, Environmental, and Sustainable Engineering.
9. Natalia Rodriguez: ASU Master of Sustainability Solutions student.
10. Nick Di Taranto: ASU Master of History student.
11. Vid Micevic: language assistant and ASU undergraduate student in sustainable engineering.
12. Marta Hulley Friedman: Program Manager, Walton Sustainability Solutions Studios.

Koprivnica, and Koprivnica-Križevci County Participants

City of Koprivnica, Koprivnica-Križevci County etc.

1. Helena Hećimović, project co-director and member of the Koprivnica City Council
2. Vesna Želježnjak, mayor of Koprivnica
3. Mišel Jakšić, vice-mayor of Koprivnica
4. Željkica Oštrkapa Međurečan, Senior Expert Advisor, Croatian Agricultural Advisory Service
5. Tomislav Mesić, Expert Advisor, Croatian Agricultural Advisory Service
6. Marijan Štimac, Head of Department for Economy and Public Utility Services of Koprivnica-Križevci County

Podravka

1. Emir Džanić, Innovation Manager, Research and Development
2. Tanja Cvetković, Director of Product Development (R&D)
3. Zdravko Matotan, Director of Agricultural Division (R&D)
4. Lana Horvat, Ecology Department (R&D)
5. Snježana Šlabek, Human Resources
6. Vesna Kadija Cmrk, Agricultural Division (R&D)

Academic Experts

1. Hrvoje Petrić, Professor of History, University of Zagreb and president of Croatian Society for Environmental History and Economic History
2. Sanda Renko, Professor of Economics, University of Zagreb
3. Josip Haramija, President of Croatian Society of Agronomists

Community Stakeholders

1. Udruga Kopriva, community organizing and gardening NGO
2. Matija Hlebar—founder of UZOR Hrvatske, recycling NGO
3. Goran Šafarek—photographer, naturalist, and president of Koprivnica Ecological Society

Local Farmers

1. Marijan Hrženjak--beekeeper and educator
2. Zdenko and Nives Vrgoč -- Jerusalem artichoke, tubers, and various vegetables
3. Željko Tonklin-- wheat, corn, rapeseed, and sugar beets
4. Zlatko and Antonio Panić-- dairy, beef, and grains
5. Davor Miklošić—«Jara« fruit tree orchards, including apple, peach, and cherry
6. Mijo Popović and family—vegetables and fruits
7. Ivan Smiljanić -- peach orchard
8. Mijo Petrić, wine maker and President of Wine makers association »Sveti Vid«, Draganovec, Koprivnica

SAŽETAK

Ovaj članak sažima istraživanja i preporuke koje proizlaze iz Projekta održive prehrane i poljodjelstva održanog u proljeće i ljeto 2014. godine u Koprivnici, Hrvatska. Projekt je nastao u suradnji Sveučilišta Arizona State iz SAD i znanstvenika, vladinih dužnosnika, poslovnih ljudi, poljoprivrednika i drugih učesnika u Koprivnici i široj regiji Podravine, temeljeći se na povijesnim i sadašnjim uvjetima lokalnog sustava proizvodnje hrane i poljoprivrede. Projekt je rezultirao preporukama kako izgraditi otpornost i održivost u tom sustavu u narednih 30 godina. Razvoj održivog lokalnog sustava prehrane uključuje daleko više od kvalitetne poljoprivrede i snažnih ekoloških mjera u očuvanju prirode; uključuje razmatranja o kvaliteti života, ekonomiji sustava prehrane, politike i upravljanja, kulturne baštine i socijalne pravde. Započinjemo određivanjem postojećih izazova i problema u održivom sustavu prehrane u Podravini; zatim procjenjujemo prepreke i mogućnosti za izgradnju održivog i otpornog sustava farmi i proizvodnje hrane u regiji; završavamo praktičnim preporukama za jačanje održivih ustava proizvodnje hrane i poljoprivrede u Koprivničko-križevačkoj županiji i široj regiji Podravine.

Vineyard Cottage road

Peach orchard

Petrić cottage

Jagnjedovec consulting

Popović farm

Popović family

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