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Organic Production in the Republic of Croatia – The Analysis of the Current Situation and Recommendation for Possible Stronger Development with Economic Implications on the National Level

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Abstract

Production of agricultural products is still characterized by low quality, increasing use of chemicals in order to achieve mass production and higher yields per unit area, which ultimately leads to cost reduction and profit increase for producers, but at the expense of end-users' health. Integrated production as the production of ecologically acceptable and economically viable agricultural and food products is becoming a priority, and thus greater incentives are granted to this type of production. The purpose of the paper is to highlight the situation on organic production in the Republic of Croatia, as well as the production of ecologically acceptable products in protected areas, with the aim of providing recommendations and argumentations to encourage forms of production that enter the realm of sustainable agriculture.

Keywords: Organic production, plastic and glass greenhouses, the Republic of Croatia
JEL Classification: A10, Q13, Q18

1. Introduction

Production of agricultural products is still characterized by low quality, increasing use of chemicals in order to achieve mass production and higher yields per unit area, which ultimately leads to cost reduction and profit increase for producers, but at the expense of end-users' health. In spite of production cost decrease, food prices are still increasing.

However, on the other hand, due to the increasing prominence given to sustainable development in response to modern challenges, sustainable agriculture is getting more and more importance within this area. Generally, such production is favored due to its final products, healthier and more natural for human health, animals, and eco-system. Republic of Croatia (in further text: R.H.) has great potential in healthy food production. On the other hand, in spite of all the possibilities, fruit and vegetable import greatly exceeds its export. One of the efficient modes of production of high-quality fresh food is represented by production in protected areas – glass and plastic greenhouses. In developed countries, it represents an important mode of agricultural production. Due to the contemporary market demand in ecological, i.e. integrated production, growing crops in the protected area represents one of the ways of providing healthier food with less economic risks and damages, both considering the price and quantity of food on the market, and income for the producers. Protected areas provide an opportunity of organic production which ensures greater quality and uniformity of products regardless of season, solves the problem of the lack of particular crops on the market, reduction in seasonal price fluctuations, and biological control of production. In countries with prevailing lower temperature climate, glass and plastic greenhouses serve to retain the heath necessary for plant growth. In contrast, in countries with higher average temperatures, such protected areas serve to prevent excessive temperature rising and solar radiation, which brings to loss of soil moisture and directly harms plants and prevents their growth.

The subject of this paper is organic production with specific interests in the production of high-quality and healthy agricultural products within protected areas – plastic and glass greenhouses.

The purpose of the paper is to shed some light on the current state of organic production in the Republic of Croatia, as well as the production of ecologically acceptable products in protected areas, **with the aim of** providing recommendations and argumentations to encourage forms of production that enter the realm of sustainable agriculture and contribute to the national balance of payment. The purpose is achieved through the detailed consideration of available data, i.e. secondary sources, in order to achieve the holistic picture of the situation. Within the present-day turbulent times, it is quite challenging to adopt agricultural production to the prevailing conditions, and particularly to the challenges like global climate changes and global warming. Closely related is also the development of sustainable and ecologically acceptable agriculture.

2. Organic Production in the Republic of Croatia

In this chapter, authors underline main facts about organic production in R.H.

Within the R.H., agricultural production output for the year 2008 amounted to 22,552.83 mil. of kuna, with the gross value added in agricultural production of 11,564.58 mil. of kuna. The overall share of agricultural production within the Croatian GNP amounted to 6.59% in 2008, which can be compared to the Czech Republic with the share of 2.4% of its GNP. By comparing R.H. to the Czech Republic and Slovakia, the diversity of importance of agriculture, as an important development factor of each particular country which share similar economic characteristics and cultural-historical heritage, can be noted. In the Czech Republic, agricultural areas cover 50.40% of its overall area, in Slovakia 42%, while approximately 23% of the R.H. overall area is formed of agricultural land. The EU average amounts to 40% of the overall area. (Eurostat, 2011). According to EUROSTAT (2011), agriculture gross value added for Czech Republic in 2005 was 1,000.23 million EUR, for Slovakia was 449.74 million EUR and for R.H. was 1,134.41 million EUR. In 2009 a sharp decline in value added is visible especially in Czech Republic, followed by Slovakia, while the decline in R.H. was smaller. In 2010 the growth of value added is evident, whilst R.H. has shown the greatest performance although the agricultural land covers only 23%, much less than in the comparing countries. According to EUROSTAT estimation for year 2009 in EU were 3,761,884.00 ha

under organic production. Czech share in areas under organic production was 267,483.00 ha and Slovakian was 111,466.00 ha in same year.

Organic agriculture represents a method of agricultural production and farming systems with the main objective of preserving the health of soil, eco-system, and people. It is based on ecological processes, bio-diversities, and cycles adapted to local conditions, with the highest possible level of use of domestic renewable sources rather than foreign, non-renewable sources which often lead to adverse consequences. Such agriculture represents the combination of tradition, innovation, and modern science, thus providing sufficient resources for farmers, minimizing or completely eliminating pollution, and also allowing enrichment of the common environment and high quality of life for all participants.

In the R.H., minimum requirements for organic production have been regulated by the Act on Ecological Production of Agricultural and Alimentary Products (Official Gazette 91/2001) and by its by-lows, as will be discussed later. Producers meeting the minimum requests defined by the same Act are also enabled to eco-mark their product when advertising and presenting it. An organic product can also be labeled by international associations and organizations, such as the Demeter Certificate, the oldest European and one of the most important world certificates. When exported into the EU countries, organic products must be submitted to the control by the EU certification bodies, thus allowing for labeling of organic products by the European eco-label. Most European countries dispose of two or more certification bodies to carry out control based on the EU Regulation No. 834/2007 (former EEC Regulation No. 2092/91). According to the information available by the Ministry of Agriculture, Fisheries and Rural Development, areas under organic production within the R.H. have been increasing constantly in the period of 2002-2010, with 51.78 ha reported in 2002, to substantial 23,282.37 ha in 2010. (Table 1)

Table 1: Areas under Organic Production in the Republic of Croatia, per County years 2008-2010/ in ha

COUNTY	2008	2009	2010
Grad Zagreb	26.63	23.81	967.44
Zagrebačka	880.23	1150.39	561.04
Splitsko-dalmatinska	195.09	105.58	174.93
Osječko-baranjska	2337.34	3693.62	7911.52
Istarska	98.48	133.91	173.26
Požeško-slavonska	1019.03	1240.26	1324.35
Šibensko-kninska	139.50	160.60	304.64
Koprivničko-križevačka	66.24	82.60	144.09
Bjelovarsko-bilogorska	201.78	623.16	812.44
Međimurska	67.26	323.39	358.35
Karlovačka	365.82	717.93	887.78
Vukovarsko-srijemska	212.43	303.37	867.46
Varaždinska	79.94	73.60	58.00
Ličko-senjska	283.85	311.68	325.58
Brodsko-posavska	860.68	1329.62	2364.33
Virovitičko-podravska	305.27	395.72	2490.07
Sisačko-moslavačka	2401.76	2525.86	1995.14
Zadarska	356.66	863.84	1003.68
Krapinsko-zagorska	11.54	19.63	53.38
Dubrovačko-neretvanska	5.29	17.00	69.70
Primorsko-goranska	96.05	98.14	435.20
TOTAL	**10,010.85**	**14,193.71**	**23.282.37**

Source: Author's elaboration, according to Ministry of Agriculture of the Republic of Croatia 2011, retrieved from: http://www.mps.hr/default.aspx?id=6184

The above Table 1 suggests leading Counties in organic productions are Sisačko-moslavačka with 1,995.14 ha in 2010, and Osječko-baranjska with 7,911.52 ha in the same year, the latter continuously recording areas over 2,000.00 ha in the last three years. Croatian Counties by the Adriatic Sea record areas smaller than 1,000.00 ha under organic production, with the County Dubrovačko-neretvanska standing out with barely 69.7 ha in 2010. This can be justified by the fact that the Panonian Counties base their economic growth mostly on agriculture and food industry (County Osječko-baranjska). In the County Sisačko-moslavačka, with agricultural areas occupying 53% of the overall County area, 43% of which arable and 33% currently in use, the County strategy states great importance to agriculture and, through various incentive programs and activities, tries to increase the arable share. In addition, this County has defined its agricultural development strategy by 2013 (County Sisačko-moslavačka, 2011). On the other hand, due to the importance given by the strategic significance of tourism in the development of the Adriatic part of Croatia, Counties along the Adriatic Coast mostly focus on the development of tourism. We have been witnessing the growing number of organic producers for the period of 2003-2010. In the period from year 2003 when there were 130 producers, the ninefold increase in their number occurred in the period from 2003 to 2010, although, the producers are geographically unevenly dispersed. There were 1125 producers in year 2010.(Ministry of Agriculture of the Republic of Croatia, retrieved from: http://www.mps.hr/default.aspx?id=6184)

In order to increase the share of organic agricultural production at 8%, in total agricultural production in R.H., the Development Plan for Eco-agriculture in period 2011-2016 was adopted. Plan's baseline is: increasing the collaboration among authorities and producers, increasing the number of organic producers associations and agri-eco-advisors, stimulation for the eco-agricultural trade fair organization, and their representation to domestic and foreign potential buyers. (Ministry of Agriculture, 2011). According to the Plan, the goal is to improve infrastructure for better placement of the organic agricultural products on the market. Through such access the farmers interest should grow. It is good to note that the state has recognized the main problems producers face such as lack of collaboration and associations on their level. It is incrementally important, if producers want to further expand with their business, to form sort of partnership and collaboration through associations which could help them in delivering their products to the market. Being alone makes investments in expanding their production and getting to the target market much harder and difficult to achieve. On the institutional and legal framework, the organic production is regulated through Act on Ecological Production, and Labeling of Eco-products (Official Gazette No. 139/2010) which is harmonized with EU legislative. On base of the Act, the R.H. has adopted several regulations which regulate ecological production, at the same time there are other regulations which are still effective, and needed to be harmonized. In order to get the Eco-certificate and Eco-mark farmer need to fulfill some conditions during so called transition period with duration interval from two to maximum five years. (Regulations on ecological production, growth of plants and herbal products, article 5, Official Gazette, 91/2001, 10/2007). In transition period the authorized control authorities control proper implementation of ecological production regulations.

The maximum amount of financial support for agricultural production in year 2011. was: till 2,894.00 kuna per ha for vegetables and perennials, till 2,394.00 kuna per ha for arable land and till 1,548.00 kuna per ha for pasturage and meadow. (Paying Agency for Agriculture, Fisheries and Rural Development, 2001:7) Unfortunately, farmers who practice eco-agriculture enjoy the same privileges like farmers who don't practice. The privileges are: partial capital investment return, subvention for the insurance premiums till 25% of value, special subsidized type of fuel etc. With regards to that, it is important to note that the subsidies have not been provided to support this kind of agricultural production and the politics towards them has to be changed.

In order to increase areas under vegetables and areas of protected agricultural production, in addition to reduction of the negative trade balance in field of vegetables, R.H. adopted The Operational Development Programme for Vegetable and Flower Growing 2008-2012. The new Programme is old improved Operational Programme for Vegetable Growing

Development which failed in implementation. Key factors for vegetable and flower growing progress are financial loans and credits for fixed assets provided by Croatian Bank for Reconstruction and Development (HBOR), and guarantee for farmers who have no guarantee instruments provided by Croatian Agency for Small Enterprises (HAMAG). Maximum guarantee is 50% of loan or 3,500,000.00 kuna. The payback period is defined as the function of the amount of investment, where higher amount implies longer payback period. HBOR loans have lower interest rate (4%) than loans and credits offered by banks. (www.mps.hr)

3. Agricultural Production in Protected Areas

In this chapter authors will display the basics facilities for agricultural production in protected areas - plastic and glass greenhouses, and the production statistics for such areas in the Republic of Croatia.

3.1. Plastic and Glass Greenhouses

Greenhouse is a facility for protected agriculture production that provides controlled climatic, biological and other conditions necessary for production, and offers year-round cultivation with several times higher yield compared to production on open spaces. Greenhouses are used for sowing seeds of different sort and plant varieties, especially for production of seedlings, reviving of cuttings and like frost protection of crops during early spring or late autumn production. Plastic foil cover affect plants so they have rapid germination, faster growth, higher yields and better quality, finally, during the vegetative propagation the reviving is faster (Karasek, 2007, p.9).

Square meter price for plastic greenhouse facility depends on the type and technical quality of the plastic greenhouse, precisely the equipment installed in greenhouse, and it also depends on whether the construction work and assembly of the plastic greenhouse is included in the price or not. With larger facility size, the average price is relatively lower. Consequently, the price under influence of these factors ranges from 15 € to 40 € for square meter. There are several types of plastic greenhouses that can be classified into three main groups (www.koting-plastenici.hr): (1) Monotunnel plastic greenhouses - They are commonly used because of the relatively low cost construction and their suitability for the production of all kinds of vegetables and flowers. They are mainly used for agricultural production in smaller areas and for agricultural production in protected areas as a hobby, (2) Multitunnel plastic greenhouses – They consists of several interconnected tunnels, and are unlike monotunnel greenhouses, mainly used for professional production of vegetables and flowers, therefore, in addition, they can also be used for growing seedlings as a professional production, and (3) Veronezi - types of plastic greenhouses that differ from the tunnel greenhouses by the fact that their structure is higher, they require more elements and therefore they have higher price. Veronezi are commonly used for tobacco growing and production of strawberries.

The advantage of plastic greenhouse is that the price of plastic film and the greenhouse construction is lower, it is easier to install and to maintain. But, plastic greenhouses have disadvantages because in medium and long term they require additional investments like plastic film renewal. Besides that the plastic film itself have poorer quality then protection wall made of glass. Due to its characteristics plastic greenhouses are suitable for the seaside areas, and glass greenhouse is suitable for continental areas. There are three basic methods for production in greenhouses (Parađiković and Kraljičak, 2008): growing in the soil, growing in peat and substrate, and growing without soil. Glass greenhouses are the perfect type of the facilities for protected agricultural production. In them, all vegetation factors can be controlled and in optimal limits. They achieve the best results in the production of vegetables and flowers (Josifović, M., 1973b, p.209). In glass greenhouses opposed then in plastic greenhouses, glass is used as a protective material. The glass thickness is usually approximately 4 mm. Glass absorbs more light, preserves more heat and does not need to be

renewed in medium or long term. According to the size and shape of the facility and shape of the roof there are three types of glass greenhouse (Kelemen, 1998): glass greenhouse with a saddle roof, glass greenhouse with awnings roof and pavilion glass greenhouse. Glass greenhouse construction is more expensive than plastic greenhouse construction, primarily due to the required concrete base, construction permit, heating system and the price of glass. In Republic of Croatia not a single company is producing glass greenhouse as a complete product, so they generally must be imported. There are only a few companies that are engaged in the manufacture of certain parts for glass greenhouse. Square meter price for glass greenhouse depends on the installed equipment and the price ranges from 30 € to 120 € for a square meter. (Parađiković i Kraljičak, 2008, p.37).

3.2. Production in Protected Areas in the Republic of Croatia

Looking at the production in protected areas on the territory of the Republic of Croatia it can be concluded that it has grown in the last ten years. However, it can be argued whether it is sufficient or in a ceaseless growth, because statistics show that the Republic of Croatia currently imports about 50% of its requirements for fruit and vegetables. In 1991, 78 ha plastic and glass greenhouses were in Croatian state – ownership. One of the reasons for this situation in RH can be rooted in the wartime events that affected for many years areas where agriculture was taking place in protected areas, transitional problems with poorly managed privatization, and in economic stagnation or even declining of economic activities of the primary sector.

The specificity of the Republic of Croatian is that three types of climate overlap in its area - continental climate in the Pannonian plains, mountain climate in the area of Gorski Kotar, Lika and Dinara mountain and Mediterranean climate in the coastal regions, from Istria in the north to Dubrovnik in the south. Due to the conserved nature and the environment, Croatia has an advantage over other developed countries as it can produce a variety of high quality food- good for consumers' health. Croatia has totally 1.3 million ha of utilized agricultural area. 66% out of these are fields and gardens, 27% permanent grasslands, 7% orchards, vineyards and olive groves, 0.4% vegetable gardens, and 0.1% nurseries. Therefore, the Croatian Government has brought a variety of programs aimed to encourage the development of agricultural production in general and within it the development of production in protected areas. Thus, in the period from 2001 to 2004 the CARDS program was applied. In 2005 Operational Program for the Development of Vegetable or the SAPARD program was adopted which sought to encourage an increase of areas under vegetables, especially in protected areas with the aim of increasing production to a level that would be sufficient for the Croatian requirements and export growth and improvement of production technology, packaging and storage of vegetables and raising the quality of products. Thereafter, the Plan for Agriculture and Rural Development for the period since 2007 - 2013 was adopted, known as the IPARD program. In order to see an increase of engagement in the part of development of agricultural production. An overview of the approved loans for the development of vegetable crops in Croatia is presented in the following table.

Table 2: Approved loans for the development of Vegetable Crops from 1 January 2007 to 31 December 2009

Year	No.	COMMERCIAL BANK	COUNTY OF END-USER	Approved kuna
2007	1.	PRIVREDNA BANKA ZAGREB D.D.	SISAČKO-MOSLAVAČKA	150.101,77
	2.	ERSTE & STEIERMARKISCHE BANK D.D.	ZAGREBAČKA	3.443.763,64

	3.	SLAVONSKA BANKA D.D.	VIROVITIČKO-PODRAVSKA	3.492.605,36
	4.	PRIVREDNA BANKA ZAGREB D.D.	VARAŽDINSKA	1.995.569,55
	5.	BANCO POPOLARE CROATIA D.D.	GRAD ZAGREB	3.492.116,94
	6.	PODRAVSKA BANKA D.D.	ZAGREBAČKA	1.002.873,21
2008	7.	ZAGREBAČKA BANKA D.D.	ZAGREBAČKA	895.455,06
	8.	HIPO ALPE-ADRIA-BANK D.D.	GRAD ZAGREB	444.687,57
	9.	PODRAVSKA BANKA D.D.	ZAGREBAČKA	1.203.378,40
2009	10.	PODRAVSKA BANKA D.D.	ZAGREBAČKA	645.726,26
	11.	PODRAVSKA BANKA D.D.	GRAD ZAGREB	782.698,49
	12.	ISTARSKA KREDITNA BANKA UMAG	ISTARSKA	2.890.246,43
	13.	SOCIETE GENERALE-SPLITSKA BANKA	GRAD ZAGREB	3.426.919,85
	14.	MEĐIMURSKA BANKA	MEĐIMURSKA	905.166,10
	15.	SOCIETE GENERALE-SPLITSKA BANKA	GRAD ZAGREB	3.470.444,36
	15.	**TOTAL**		**28.241.753,19**

Source: Author's elaboration, according to: Croatian Agricultural Extension Service, Annual Report for 2009 and agenda for 2010

According to data available in 2006 the situation was as follows: 40 ha under glass greenhouses and 220 ha under plastic greenhouses. In the period from 2002 to 2006 the area under plastic greenhouses had increased by almost 50% (Ministry of Agriculture, SAPARD Program Plan, 2005, p.49). Furthermore, in the period from 1st of January 2007 to 31st of December 2009, as presented in Table 2, loans from commercial banks that are approved for the development of Vegetable Crops were over 28 mil. of kuna. Most loans were approved to farmers in the Zagreb County and the City of Zagreb with 2 / 3 of the total amount. With these funds new 8.5 ha of plastic greenhouses were built in this period at the state level and 4.9 ha of glass greenhouses. It should be noted that this does not include loans of HBOR. Samek Ltd. and ZARJA GROUP Ltd were particularly emphasized in the raising of new greenhouses. Below is an overview of agricultural area under plastic and glass greenhouses in RH in 2010.

Table 3: Agricultural area under glass and plastic greenhouses in Croatia in 2010 in ha

County	**Number of parcels**	**Acreage**
Bjelovarsko-bilogorska	117	12,06
Brodsko-posavska	120	8,97
Dubrovačko-neretvanska	539	38,25

Grad Zagreb	440	63,39
Istarska	205	19,7
Karlovača	65	5,43
Koprivničko-križevačka	299	27.06
Krapinsko-zagorska	156	8,43
Ličko-senjska	14	1,91
Međimurska	125	7,05
Osječko-baranjska	449	38,18
Požeško-slavonska	61	6,12
Primorsko-goranska	96	2,8
Sisačko-moslavačka	155	7,08
Splitsko-dalmatinska	578	76,67
Šibensko-kninska	22	0,8
Varaždinska	484	27,02
Virovitičko-podravska	519	42,13
Vukovarsko-srijemska	141	9,33
Zadarska	135	20,07
Zagrebačka	583	52,84
Total	**5.303**	**475,29**

Source: Author's elaboration, according to: Paying Agency for Agriculture, Fisheries and Rural Development, Farm Register, 2011

One of the important factors that influenced building of new plastic and glass greenhouses in the last few years is certainly the return of capital investment for farmers, which amounted to 40% and loans of HBOR with favorable interest rate. This can be seen in Table 3 which shows the agricultural area under glass and plastic greenhouses. Accordingly, in 2010 the area under protection amounted to 475 ha. Based on the date it can be concluded that the area under glass and plastic greenhouses has nearly doubled in the last five years compared to the amount of 260 ha in 2006. Analyzing Table 3 it can be seen that nearly 25% of protected areas are located in the region of the City of Zagreb and the Zagreb County and almost 25% are located in the very south of Croatia, in the Splitsko-dalmatinska and the Dubrovačko-neretvanska County. The least protected areas are located in the Šibensko-kninska, Ličko-senjska and Primorsko-goranska county. The average parcel in RH where the glass and plastic greenhouses are located amounted to less than 900m^2.

4. Concluding Remarks and Recommendations

By increasing domestic agricultural production through integration of organic production and production in the protected areas the new dimension will be provided which except helping to improve the balance of trade, transfers price competitiveness to quality competitiveness. In the shortest possible time the investments must be focused in the organic agriculture, in order to initially settle the requirements of R.H., and afterwards allowing the export of quality products to the EU market. By increasing the average number of hectares per organic farmer from the current 20.7 ha and increasing the areas under protection, the competition with European producers which in average, have multiple larger areas per farmer will be facilitated. Increasing reinvestment in the primary sector will contribute towards reducing the outflow of people from rural areas and to ensuring the path for reaching the sustainable development.

The stumbling blocks for the development of organic production and small number of potential producers is a lack of associations through which they can place their products and the lack of experts who will advise farmers about the methods of production and other things that are not directly related to the production. It is necessary to establish some advisory bodies on the level of individual counties, what is under the responsibility of the Ministry of Agriculture, as these kind of bodies do not exists in all counties. The establishment of such

bodies, which exist in far greater number in some EU countries, would significantly facilitate farmers, both current and potential farmers, because they would be able to obtain information from the experts. It is extremely important to get information from the experts because that directly affects the level of production itself, if we consider the assumption that adherence to professional and timely advices leads to higher yields per unit area.

As previously noted, the establishment of associations by the producers themselves is important. In this way they will be able to place their products on domestic and foreign markets as well as get other benefits which they may not be able to afford to themselves, such as purchases of particular machinery and equipment on the principle of so-called machine rings. So, members of the association could use machines that would be in joint ownership, depending on need of each member. Associations could also provide outsourcing services to farmers, such as the sale of products over the internet (through the establishment of a separate company which would be owned by farmers). In such a way they could devote more of their time to the production and fully avail the potential that it offers.

The role of the state that wants to invest in the development of organic production and production in protected areas should be in helping its producers to promote their products. One of the possible ways could be to organize trade fairs at which farmers will be able to present their products to potential customers. The state support may consist in subsidizing producers or their associations to participate in various domestic and foreign fairs and events.

Act and bylaws must be fully standardize with EU Regulations in the following years so that the dual certification of products in export to EU countries won't be necessary, as the regulation will take place on the same basis thus reducing indirect costs of products.

Finally, it raises the issue of certificates such as the Demeter Certificate, etc. If the world market accepts certificates of civic associations, is it even necessary to have a state, ie, legally certificates? Do Croatian farmers need to compete with quality or price? These are still somewhat unanswered questions. On the way of development of the agricultural sector, the Republic of Croatia needs to point its efforts where it is most necessary – to small farmers and help them in finding adequate solutions in better and greater placement of their products to domestic and foreign markets.

The paper's purpose was to get to know about the status of agricultural production under protected areas in the Republic of Croatia, as well as its trends in the period of 5-10 years, with a focus on the future. So, it wanted to get to specific information upon which adopted conclusions and given recommendations of the development of this segment of agricultural production in which can be seen exceptional potential in the future, relating to the general development of society, global changes and challenges. Just that was the aim of this paper.

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