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Integrated agricultural production in Croatia

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Abstract

Integrated agricultural production in Croatia was founded in 2010 with the first ordinance within Agriculture law, although by then it was managed in that way for the last fifteen years. Producers in integrated production as legal or natural persons produce by the principles of integrated production in accordance with the Order on the integrated production of agricultural products (NN 137/12) and Technological instructions for integrated production. Integrated production monitoring is carried out by Agricultural Advisory Service, after which producers are allowed to put the label of integrated production on their products. Since 2010 the integrated agricultural production has increased, and today it includes 727 producers and 76456.51 hectares of agricultural land. The greatest part of integrated production is under arable crops in the eastern part of Croatia. After arable crops, integrated production of grapes and fruit is significantly represented, while integrated vegetable production is represented in the minor part. Consolidation of production plots and modern management by major production companies, which seek highly competitive agricultural products, is a precondition for strengthening the integrated production in Croatia.

Key words: integrated agricultural production, producers of integrated production, labelling of integrated products

1 Introduction

Integrated production of agricultural products implies balanced application of agro-technical measures with respect of economic, organic and toxicological factors. In a case of equal economic effects, the advantage is given to organically and toxicologically approved measures. The legal foundation for integrated production in Republic of Croatia has been established in year 2010, but agricultural production has been based on principles of integrated production for almost 15 years. The reason for that delay could be the global concept of EU agricultural policy tied to preservation of environment from pollution by nitrates, phosphates and pesticides with regards to preservation of biodiversity and ecosystems. Proper land management results with public goods in area of environmental protection (protection of soil, water, air, landscape) and it is also very valuable in sustainable rural development. On the other side, the development of integrated agricultural production is managed by laws of the market. Consumers are in demand for confirmed quality products and, through that demand, they are setting up a model of agriculture production.

Integrated agricultural production, in accordance with its principles, is between conventional agriculture productions which includes almost of Croatian agriculture and organic production which is 2,91% of total of total used agricultural area. Development of integrated agricultural production started almost ten years after establishing of organic production. The Act on organic production of agricultural products and foodstuffs was adopted in 2001 (NN 12/01). The relevant ordinances were adopted in 2001, 2002 and 2003. The Act and ordinance regulates organic production of agriculture products and foodstuffs, processing, trading, labelling, certification and inspection. Ministry of Agriculture authorised 7 control bodies (private legal entities) for control of organic production. They are accredited by Croatian Accreditation Agency. Direct subsidies for organic production have been given by the state from 2002 by Law on State Aid in Agriculture, Fisheries and Forestry (NN 87/02).

The concept of integrated agricultural production is developing following development of organic production. In this study we have been monitoring state of integrated agricultural production in Republic of Croatia within the three year period according to area of production and geographical regions. Also, EU membership will ensure an even faster further development of integrated production sector.

2 Datasets and Methods

2.1 The basic legislation

Integrated production in the Republic of Croatia is regulated:

- The Agriculture Act (NN 149/09, 127/10, 50/12, 120/12);
- Ordinance on integrated production of agricultural products (NN 137/12);
- Act on support of agriculture and rural development (NN 120/12, 136/12); and
- Ordinance on the implementation of direct payment and IAKS measures of rural development (NN 145/12).

Pursuant to the Ordinance on integrated production of agricultural products (NN 137/12) and Technical guidelines of integrated production, producers in integrated production are the natural or legal person. Technical guidelines are describing all mandatory agricultural measures for producers. Obligations of producers are to keep the records of production of integrated productions for each LPIS parcel, and to attend lectures for at least 5 hours every year. Based on that, yearly training producers are getting the appropriate verification. Producers must include all the land registered into LPIS system for each sector of agriculture production (orchards, vineyards, vegetables, arable crops) except lands for organic production.

2.2 Producers in integrated production

Integrated production can only be carried out by the producers registered in the register. The application for registration in the register of producers must be accompanied by the following:

- decision on registration in the Register of farms as natural or legal person;
- evidence of agricultural lands into LIPS system (farm records);
- report on the first control of integrated production; and
- statement by the producer that they are acquainted with the regulations and rules on integrated production.

The obligation of the producers is to remain in the integrated production at least for two years so that could apply for state subsidies. The Ministry of Agriculture is managing the Register of integrated producers under the electronic system of Paying Agency for Agriculture, Fisheries and Rural Development.

2.3 Control of integrated production

Agricultural Extension Services is carrying out control of farms at least once per year. They are checking conformity with the basic requirements for integrated production for current year. The

report of performed control will be submitted by employer of Agricultural Extension Services. An integrated product shall receive a certificate after a completed prescribed conformity assessment procedure. Based on that certificate, products may be labelled by state logo of integrated production or declared as “agricultural products from integrated production” (Pohajda and Ševar 2013).

2.4 Geographical position

Croatian territory is divided into 3 large natural-geographic units:

- the Pannonian and Sub-Pannonian area which encompasses lowland and hilly parts of eastern and northwestern Croatia. The largest part of the area is used for agricultural and livestock production;
- the mountainous area which separates Pannonian Croatia from its coastal part and offers great possibilities for development of rural and winter tourism; and
- the Adriatic coast which encompasses the narrow borderline coastal zone that is separated from the background by high mountains.

The Croatian Adriatic coast has more than 1000 islands and it is one of the most indented in Europe. A mild climate enables the production of Mediterranean cultures. Croatia is divided into 20 counties (Županija) and City of Zagreb.

2.5 Total structure of agricultural production in Croatia

According to the Statistical Yearbook 2005, the total surface area of agricultural land is 2. 695. 000 ha, which makes 48, 2 % of the total continental surface, from data Central Bureau of Statistics 2011, used agricultural area is 1. 326. 083 ha. A few years ago there is increased trend used agricultural area. Used agricultural area in 2011 compared with 2007 has increased from 124. 327 ha or 10, 35% compared on area in 2007. The largest part of the agricultural area with arable land is located in Slavonija. The mountainous area of central Croatia participates significantly with meadows and pastures, while the share of vineyards, olive groves and orchards to a certain extent is traditionally much greater in the coastal and island land than in the other agricultural regions. Out of the total registered farms, 63% are less than three hectares large. The power of medium to large farms (from 20 to 300 hectares), which own about 32% of agricultural land and whose importance for market sale is increasing, and has been on the rise for the last ten years. However, the largest share of market production is focused on large farms which are also the ones which have been growing at a fastest rate last years. In relation to the EU countries, Croatia uses less agricultural land per farm, either on the basis of comparing commercial support beneficiaries or all farms. The above fact points to extensive fragmentation of farms which is still strong in Croatia and whereat the average commercial farm encompasses and the average of all farms only 2. 9 ha (Ministarstvo poljoprivrede, šumarstva i vodnoga gospodarstva, 2007).

2.5.1 Crop production

In the total structure of agricultural production in Croatia, cereal production is the most significant. Corn with 62% and wheat with 27% are dominant. Corn and wheat farming is the most important in Croatia, resistant varieties are sown with high quality and quantity yield (Kozumplik, V., Pejić, I., 2012). For several years now, Croatia has been more than self-sufficient in the cereal sector and that is mostly because of the fact that the production of wheat is significantly larger than it's total domestic consumption. Oil plants production covers less than 80 percent of domestic needs for raw vegetable oils and fats.

2.5.2 Viticulture

Wine production in Croatia has a very long tradition. Statistically, most farms are registered as those with vineyards (about 150 000). More than 95% of them have surfaces up to half a hectare which shows that there are many farmers who are in the wine business for hobby, a significant part of the consumption stays on the farm. Regarding natural conditions for growing wine

grapes, two regions can be distinguished: the continental and the costal Croatia with a total of 13 sub-regions. The increased presence of wines with geographic origin, has been a constant trend for the last 15 years. The increase of wine quality has been significant with substantially improved sensory properties (Alpeza et al, 2010) and maintenance characteristic aromatic specificity (Pohajda, 2006). The quality of wine from family farms has been increased and it is connected with consumption of wines by tourists.

2.5.3 Fruit production

Croatia has favourable agro-climatic conditions and areas for horticulture production. The different fruit varieties are competitive on same land areas. In the Mediterranean area olive trees are planted on almost all of land. Apples with 39, 41% and tangerines with 33, 19% are the most frequent types of fruit in domestic production, then plum 10, 87% peach and nectarine 3, 65%, Cherries 2, 65% sour cherries 2, 61%, pears 2, 26% and walnuts 1, 35%. The production of remaining fruit varieties is under 1%. Very important production are the nurseries and that is a support for development of fruit growing. In 2008 Croatia has produced 3. 784. 645 seedlings of different fruit varieties, 64 nurseries are producing from 1. 000 to 500.000 seedlings each. Out of total production seedlings of fruit varieties, the most represented seedlings are: apples (38%), olive trees (12%), plums (8,6%), hazelnut (7,5%), sour cherries (7,3%), apricots (2,3%), walnuts (1,6%), figs (1%). Production of seedlings of fruit varieties has been increased more than three times during last 10 years. However, it's not enough and some quantities are imported (Par et al., 2009).

2.5.4 Vegetable production

Vegetables and potatoes in Croatia are produced on 135. 000 ha, and it is 9,3% of total share of arable land. Vegetables, except potatoes, are produced on 70.000 ha with more than 370.000 tons which is not sufficient for domestic consumption. Almost 70% of vegetable production is produced on family farms, out of that 3% in protected areas (Ministarstvo poljoprivrede, šumarstva i vodnoga gospodarstva, 2007). The implementation of modern growing technology will improve vegetable production on open field and protected areas. One of examples is using of different kind of mulch in vegetable production on open field (Dudaš, 2009, Dudaš and Jurica, 2009, Dudaš and Kaufmann, 2010).

3 Results and discussion

Ordinance on integrated production of agricultural products was adopted in 2010 (NN32/10), the Ministry of Agriculture enters the producers in the Register of producers in integrated production. Total number of registered integrated farmers in 2010 was 23 and total area in integrated production was 170,78 ha. During the first year majority of production included in the Register of producers in integrated production was the production of fruits and grapes. During the year 2011 (Table 1) other production sectors were included, so now we can make a comparison between situation in Register of producers in integrated production in 2012 (Table 2) and other coming sessions.

Table 1: Integrated production in 2011.

County	Fruit production	Viticulture	Vegetable production	Crops production	Total (ha)	Number of producers
City of Zagreb	78,32	1,29	0	128,96	208,57	16
Bjelovarsko-bilogorska	16,57	3,90	4,54	141,07	166,08	18
Brodsko-posavska	20,09	21,86	0	2114,63	2156,6	19
Dubrovačko-neretvanske	0,55	3,12	0	0	3,67	1
Istarska	229,64	527,94	21,55	315,83	1094,96	4
Karlovačka	22,56	3,73	0	327,92	354,22	8
Ličko-senjska	0	0	0	0	0	0

Koprivničko-križevačka	81,47	8,91	8,22	0	787,05	31
Krapinsko-zagorska	2,57	0,80	0	688,44	3,37	4
Međimurska	356,06	185,54	115	700,90	1357,50	51
Osječko-baranjska	620,34	932,76	26,18	24474,51	26053,8	96
Požeško-slavonska	37,29	546,77	3,73	8113,84	8701,64	92
Primorsko-goranska	1,46	18,24	0	0	19,7	3
Sisačko-moslavačka	17,26	6,14	0	2522,94	2546,34	20
Splitsko-dalmatinska	4,77	2,38	0	0	7,15	6
Šibensko-kninska	3,58	0	5,3	0	8,88	1
Varaždinska	0	0	0	85,21	85,21	2
Virovitičko-podravska	312,42	5,65	56,47	15309,82	15684,38	147
Vukovarsko-srijemska	27,07	158,80	460,00	11719,67	12365,55	8
Zadarska	251,75	54,88	17,52	5,14	329,29	5
Zagrebačka	86,7	0	0	298,43	385,13	15
Total	2170,47	2482,71	718,51	66947,31	72319,09	547

Table 2: Integrated production in 2012.

County	Fruit production	Viticulture	Vegetable production	Crops production	Total (ha)	Number of producers
City of Zagreb	172,48	2,68	1,69	128,96	305,81	32
Bjelovarsko-bilogorska	61,46	4,54	11,90	185,89	263,97	24
Brodsko-posavska	26,92	0	21,86	3096,53	3145,33	35
Dubrovačko-neretvanske	1,95	0	3,12	0	5,07	2
Istarska	240,42	22,75	680,45	334,18	1277,8	17
Karlovačka	22,56	0	3,73	327,92	354,22	8
Ličko-senjska	2,38	0	0	11,21	13,59	2
Koprivničko-križevačka	96,50	8,22	8,91	734,38	848,02	36
Krapinsko-zagorska	11,05	0	6,68	0	17,74	10
Međimurska	359,41	115	185,54	805,26	1465,22	55
Osječko-baranjska	684,09	27,41	926,16	27978,69	29616,36	126
Požeško-slavonska	54,72	3,73	600,17	7973,80	8632,43	98
Primorsko-goranska	1,46	0	73,89	0	75,35	4
Sisačko-moslavačka	17,26	0	6,14	2720,39	2743,79	21
Splitsko-dalmatinska	8,95	0	2,38	0	11,33	11
Šibensko-kninska	4,56	5,3	0	0	9,86	2
Varaždinska	9,92	0	0	85,21	95,13	3

Virovitičko-podravska	326,58	56,47	5,65	15891,90	16280,62	155
Vukovarsko-srijemska	46,49	460,35	457,17	13351,01	14315,03	15
Zadarska	268,63	17,52	66,38	5,14	357,67	8
Zagrebačka	106,59	0	0,86	301,93	409,38	19
Total	2524,46	3062,71	723,97	73932,45	80243,61	683

The largest number of agricultural land has been included in arable crops production 73.932,40 ha (cereals production). Cereals production is mostly present in counties: Osječko-baranjska, Vukovarsko-srijemska and Virovitičko-podravska, which is situated in the east part of the Croatia (Figure 1).



Figure 1: Counties with greatest crops production.

The integrated production of grapes is cultivated on 3062,68 ha with significant area in counties Osječko-baranjska and Požeško-slavonska in the continental part of Croatia and coastal part in Istarska county (Figure 2).

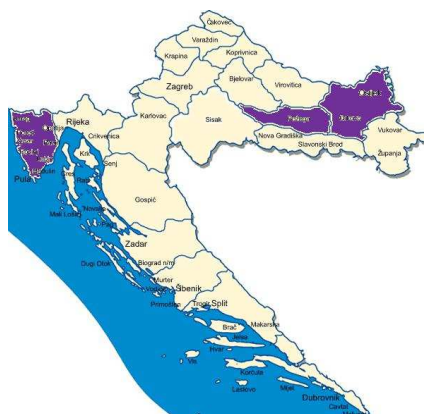


Figure 2: Counties with greatest grapes production.

The integrated production of fruits is cultivated on 2524,46 ha in counties: Osječko-baranjska, Međimurska and Virovitičko-podravska (Figure 3).



Figure 3: Counties with greatest fruits production.

The integrated production of vegetables is cultivated on 723,97 ha in counties: Vukovarsko-srijemska, Virovitičko-podravska and Međimurska (Figure 4).



Figure 4: Counties with greatest vegetables production.

On a sample of 117 findings of agricultural inspection, the mostly found irregularities in compliment with integrated production are shown in Table 3.

Table 3: The overview of the mostly found irregularities.

Irregularities in integrated production	Number of irregularities	Percentage of irregularities
All areas under one sector of production are not included	55	47,00%
There is no records of production	18	15,38%
Seed and seedlings are not certified	13	11,11%
Non conformity with direct payment (subsidies)	11	9,40%
soil analysis is not conducted in period of least five years	6	5,13%
Used pesticides are not allowed in technical guidelines for integrated production	3	2,56%
Pesticides are not allowed according to Act on Plant Protection Products	3	2,56%
Registration for subsidies without production	3	2,56%
Giving up from integrated production	2	1,70%
minimum requirements on size of the production area are not respected (orchards less than 0,1 ha)	1	0,85%
No crop rotations and balance of nutrients	1	0,85%
No report on new production areas	1	0,85%
Total	117	99,95%

From above table we can see the trend of irregularities: not keeping of production records, using not certified seeds or seedlings and etc. Starting in year 2013, the Agricultural Extension Services have a Unit for control of integrated production. Agricultural Extension Services advisers are educating producers under the integrated production scheme. Information and promotion brochures for integrated production can be found on official Agricultural Extension Services web site. According to Register of producers in integrated production in 2010 number of newly enrolled producers was 23, in 2011 that number was 540 and in year 2012 the number was 120. Total number of integrated producers was 683 in December of 2012. The reason of increased number of producers is additional financial support through the rural development measures.

4 Conclusions

Integrated agricultural production in Croatia is developing faster than organic production. With improved conditions integrated agriculture will produce additional economic value in rural areas through the increase of return per unit of invested workforce, particularly in family holdings. In integrated production most of the production is in the east part of the Croatia. Areas under integrated production are divided between crop production on the one side and vineyards, orchards and vegetables production on the other side. Further development of integrated production is relying on farm enlargement and establishment of producers organisations. Those organisations will gather smaller producers with common aim to increase quality of integrated products.

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