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# ANALYSIS OF ECONOMIC POTENTIAL IN SECTOR OF VITICULTURE AND ENOLOGY IN POZEGA-SLAVONIA COUNTY

## Abstract:

Pozega-Slavonia County has a long tradition of viticulture and oenology at which it becomes ever more recognizable. Although this is the economic segment of high importance for the local economy and regional development this study has shown that there is low percentage of representation in relation to the total agriculture potential of the county. In Republic of Croatia there are counties with higher number of vineyards planted (per unit of the area) vine production in Pozega-Slavonia County shows a greater amount of products of higher quality. With the analysis of the available statistical data it has been noticed that there is room for growth of this market segment and potential of multiplier effects in the development of the local economy with additional uprising in this sector.

The target of the research has been gaining an insight into the current state of the agricultural sector of Pozega-Slavonia County emphasizing on production of fresh grapes and wine. Goal was to gain perspective in correlation between viticulture and winemaking with complete agriculture situation in Pozega-Slavonia County and to compare this branch with other counties in Croatia.

## Keywords:

Wine, viticulture, oenology, wine trade, regional development, grapes, tourism

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## Data processing

The study was conducted by analyzing statistical data available from public institutions of the Republic of Croatia (the Paying Agency for Agriculture, Fisheries and Rural Development, Central Bureau of Statistics, Croatian Chamber of Commerce, Požeško-Slavonska County office) that in their job description have processing of statistical data and publishing results. Suspecting the possibility that not all of the stakeholders are included in data analysis available by institutions, all of the data is subject to the standard error of medium value. As all data inputs are equally subject to error it is realistic to assume that the nominal amounts of data fluctuate from real data, but the likelihood is that the error uniformly susceptible to all the data so that the trend towards conclusions should be within the significance level of less than 5%. Although there is the possibility of divergence between the published data and the realistic situation in the economy, data published by institutions is considered official and as such it is used in the processing and analysis of this paper. It is important to note that all legal entities operating in the agricultural sector are not liable to income tax system. Therefore, the total value of the agricultural sector in the Požeško-slavonia County can be higher than the official statistics of the Tax Administration, Chamber of Commerce and the National Bureau of Statistics. Due to the impossibility of collecting data on the total value of output with all entities involved in agricultural sector research activity is focused only on income tax payers. Official statistic is issued by stated public institutions and as such is considered relevant data.

### Analysis of the sector viticulture and winemaking in Croatia

The territory of the Republic of Croatia is located between the limits of 42° and 47° north latitude. The

entire economic sector of viticulture and oenology at the national level in a sense of territorial and administrative view is organized in accordance with the Regulations on the geographical areas of wine growing and it divides the entire territory of the Republic of Croatia into 3 regions, 12 sub-regions and 72 wine regions [1].

| Region                      | Surface (hectare) | %     | Zone          | Surface (hectare) | %     |
|-----------------------------|-------------------|-------|---------------|-------------------|-------|
| Eastern Continental Croatia | 6.482,38          | 31,30 | Zona B        | 4.062,72          | 19,62 |
| Coastal Croatia             | 10.163,97         | 49,08 | Zona C1       | 6.482,38          | 31,30 |
| West continental Croatia    | 4.062,72          | 19,62 | Zona C2       | 10.163,97         | 49,08 |
| <b>Total:</b>               | <b>20.709,07</b>  |       | <b>Total:</b> | <b>20.709,07</b>  |       |

*Table 1: Vine-growing regions and zones in the Republic of Croatia*

According to the previously mentioned Regulations the entire territory of Croatia belongs to the vine growing zone B (sub region Moslavina, Prigorje - Bilogora, Plešivica, Pokuplje and Zagorje - Medjimurje), zone C (sub region Hrvatsko Podunavlje and Slavonija), zone CII (sub region Hrvatska Istra, Hrvatsko primorje, Dalmatinska zagora) and zone CIII (sub region Sjeverna Dalmacija and Srednja and Južna Dalmacija). According to the data available from the Agency for Payments in Agriculture, Fisheries and Rural Development (below: Paying Agency) which was created based on an analysis of the national system of identification of land parcels, and records the use of agricultural land in the Republic of Croatia (below: ARKOD) in 2015th there was total of 1.094.793,30 hectares [2] of agricultural land available on national level. Paying Agency reported that total area of vineyards was 20.709 hectares (cumulative of all sub regions) and on that surface in 2015th was produced a total of 690,787.39

hectoliters of wine [3]. The total land surface of Croatia is 56,594 km<sup>2</sup> [4] and usage for the purpose of agricultural land makes total of 19.34 %. Plantations of vineyards occupy 20.709,07 hectares or 1.89% of total agricultural land of the Republic of Croatia. Highest amount of surface on which there

are crops of vineyards is found in Istria County (3.106,04 ha), followed by Osijek-Baranja County (2.479,77 ha), Dubrovnik County (2.467,49 ha), Split-Dalmatia County (1.898,12 ha), Vukovar-Srijem County (1.696,12 ha), Zadar County (1.524,00 ha) and Požega-Slavonia County (1.424,68).

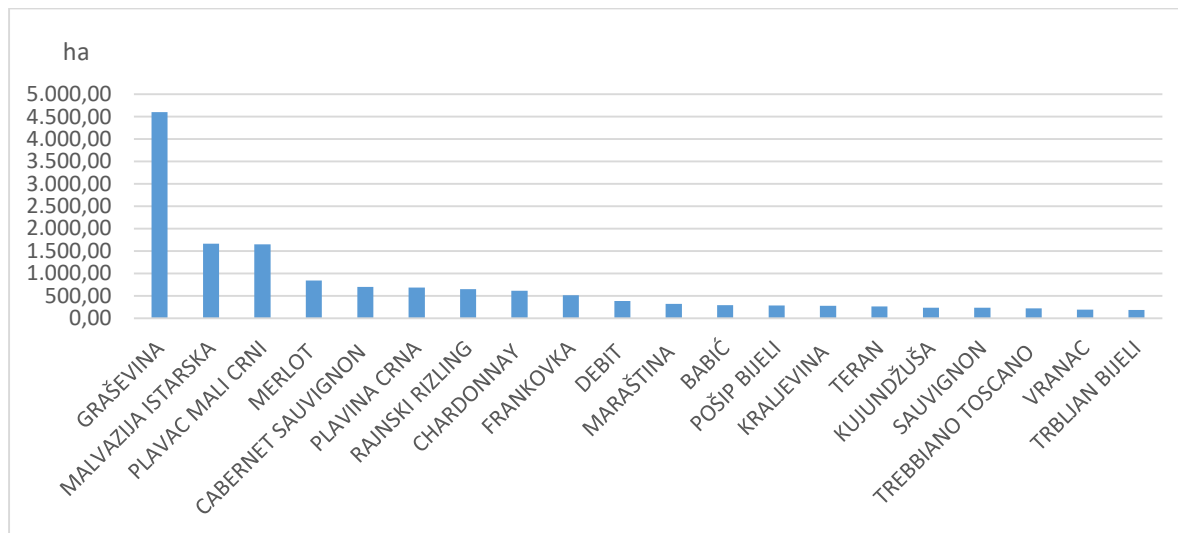


Table 2: Distribution of grape varieties in Croatia

By the total sum of all area surfaces in agriculture (expressed in ha) at the national level it is noted that most common grape variety is Graševina with 4.598,52 hectares (over 22 % of total production), followed by the Istrian Malvasia 1.664,34 hectares (over 8 %) and Plavac Mali 1.650,44 ha (over 7 %). The top three vine culture account for over 38 % of the total utilization of agricultural land are under vineyards while other varieties of vine does not exceed more than 1000 hectares (cumulative over the entire surface of the Republic of Croatia/ per varieties). Sector of wine production, observed in the context of the district (regional) division is led by the Osijek-Baranja County with a production of over 136.000,00 hectoliters and makes 19.77 % of the total wine production. Požega-Slavonia County (below: PSC) is fourth in wine production makes 9.93 % of the total national production of wine

| County                 | Grapes (ton) | Wine red/ rose (hectoliters) | Wine white (hectoliters) | Total (hectoliters) |
|------------------------|--------------|------------------------------|--------------------------|---------------------|
| Osječko-baranjska      | 20.807,32    | 26.319,62                    | 110.248,76               | 136.568,38          |
| Istarska               | 17.954,56    | 42.821,30                    | 76.803,14                | 119.624,44          |
| Vukovarsko-srijemska   | 13.317,28    | 9.797,21                     | 82.030,45                | 91.827,66           |
| Požeško-slavonska      | 10.775,09    | 7.140,75                     | 61.421,54                | 68.562,29           |
| Dubrovačko-neretvanska | 7.909,22     | 36.200,41                    | 15.782,71                | 51.983,12           |
| Zagrebačka             | 5.956,45     | 4.467,88                     | 37.381,76                | 41.849,64           |
| Splitsko-dalmatinska   | 6.481,43     | 20.234,73                    | 20.059,83                | 40.294,56           |
| Total (all Countys)    | 105.366,61   | 176.599,05                   | 514.188,34               | 690.787,39          |

Table 3: County according to the total grape and wine production in 2015th

According to data for 2015th issued by the Paying Agency in all wine regions of Croatia there is a total of 20.709,00 hectares of vineyards witch produce 105.366,61 tons of fresh grapes and a total of 690.787,39 liters of wine. On average, this would mean that the yield per hectare was 5.09 tons while from one kilogram of grapes it was produced 0.66 liters of wine. These conclusions came from calculating the mean of the total data and may vary depending on the way the vines but also on the method of production of wine.

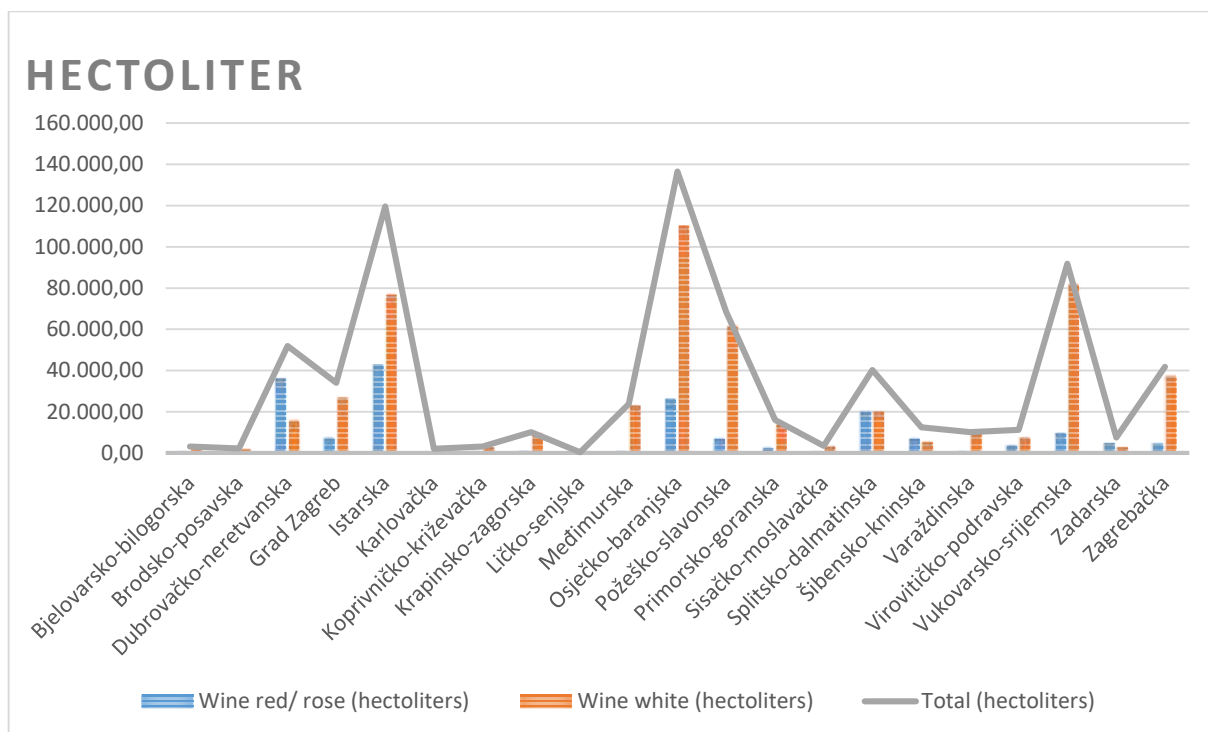


Table 4: Production of wine by county 2015<sup>th</sup>

Wine consumption (per capita) in 2015<sup>th</sup> is estimated at 24.5 liters. The economic value of wine production represents 7.3 % of total agricultural production [5]. According to the data available from Croatian Chamber of Economy in 2015<sup>th</sup> import / export balance of the wine sector was negative.

| PRODUCT              | IMPORT |            | EXPORT |            | BALANCE     | EXPORT-IMPORT RATIO |
|----------------------|--------|------------|--------|------------|-------------|---------------------|
|                      | 2015.  |            | 2015.  |            | 2015        |                     |
|                      | TON    | EUR        | TON    | u EUR      | u EUR       | (%)                 |
| Wine of fresh grapes | 28.920 | 29.006.754 | 4.932  | 12.398.328 | -16.608.426 | 43                  |

Table 6: Balance of import / export of wine of fresh grapes

The coverage of import by export ratios is only 43% giving a negative sing to foreign trade balance of the wine sector. Although the Republic of Croatia geographically and climatically situated in extremely favorable conditions for the production of

grapes and wine, and there are several centuries-old tradition of viticulture and wine, market balance still failed to achieve more exports than imports. Researching this disbalance by analyzing of the current state of the sector of wine production may

give a partial answer to this problem in the fact of the high costs of grape production in the domestic economy. According to the analysis of the Institute of Social Sciences Ivo Pilar from 2013 year the problems of first instance encountered by winegrowers and winemakers in the production and sale of grape and wine listed is the high price of putting wine on the market [6]. The average price of lower quality wine in the Republic of Croatia was 7.29 kuna per liter. This price level is the result of data

analysis of average prices in 2014<sup>th</sup> and 2015<sup>th</sup> and are available from the Bureau of Statistics [7]. The average exchange rate of the euro against the kuna in the year 2014/2015 was 7.638 EUR [8]. From this we conclude that the average price of table wine in the Republic of Croatia is the not less than 0.95 euros per kilo while the most competitive import competitor offers its products at a price not less than 0.77 euro per kilo according to Croatian Chamber of Economy.

| COUNTRY FOR EXPORT       | EXPORT 2015. |            | COUNTRY OF ORIGIN      | IMPORT 2015. |            |
|--------------------------|--------------|------------|------------------------|--------------|------------|
|                          | ton          | EURO       |                        | ton          | EURP       |
| Bosnia and Herzegovina   | 1.619        | 4.393.716  | Macedonia              | 14.228       | 10.992.860 |
| Germany                  | 683          | 1.675.768  | Italy                  | 5.771        | 4.604.763  |
| Czech Republic           | 1.680        | 1.092.048  | France                 | 510          | 4.078.387  |
| Montenegro               | 144          | 901.809    | Germany                | 922          | 2.101.270  |
| Serbia                   | 126          | 665.913    | Kosovo                 | 3.607        | 1.908.160  |
| United States of America | 94           | 566.586    | Bosnia and Herzegovina | 1.209        | 1.192.427  |
| Netherlands              | 19           | 522.353    | Slovenia               | 271          | 789.290    |
| Austria                  | 147          | 485.000    | Spain                  | 428          | 754.380    |
| Switzerland              | 47           | 227.067    | Hungary                | 508          | 342.864    |
| Singapore                | 6            | 225.230    | Austrija               | 114          | 336.794    |
| Slovenia                 | 57           | 206.638    | Montenegro             | 548          | 327.977    |
| China                    | 17           | 164.111    | Czech Republic         | 243          | 322.542    |
| Canada                   | 23           | 109.969    | Serbia                 | 267          | 290.844    |
| Japan                    | 16           | 79.642     | Other countries        | 294          | 964.196    |
| Wine of fresh grapes     | 4.932        | 12.398.328 | Wine of fresh grapes   | 28.920       | 29.006.754 |

Table 7: Import and export of wine in 2015<sup>th</sup>

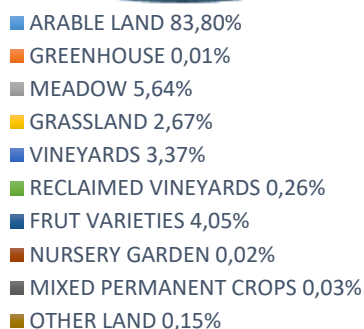
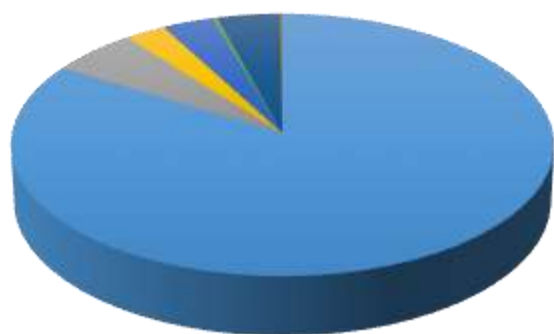
### Agriculture in Pozege- Slavonia County

According to data available from the Administrative Department for Economy and Construction Pozege-Slavonia County this regional government unit has surface area of total 181.811,00 ha (or 1.832 km<sup>2</sup>), which makes 3.2% of all land of

Croatia. Of the total area of the county declarative agriculture acreage makes 81.442,59 ha (49.29% of the area) but National system of identification of land parcels, and records the use of agricultural land (ARKOD) system accounts for only 42.443,61 hectares which makes utilization of 3.87% of total agricultural land of the Republic of Croatian. Such utilization of agricultural land puts PSC in the ninth

place (out of total of twenty-one county). As ARKOD system is an integral part of the Integrated Administration and Control System (IACS) by which the Member States of the European Union allocate, monitor and control direct payments to farmers and includes areas that are really used in agriculture for this research it provides relevant statistical information.

The most common types of use of agricultural land in the PSC applies to arable land with a total of 36.419,53 ha (83.80%). Under permanent vine is only 1.462,57 hectares and is located behind the meadow (2.451,46 ha) and orchards (1.760,07 ha).



*Table 8: Surface and uses of agricultural land in PSC*

The most common crops that were sown in the examined period (season 2014th / 2015th) in PSC relate to corn 11.191,30 ha, wheat 6.923,71 ha, soy 3.407,56 ha, barley 2.631,48 ha, meadow 2.193,87 ha, oats 1.998,24 ha, grass 1.833,26 ha, tobacco 999,16 ha

According to Croatian Chamber of Economy in 2014th the share in total "GDP" income of PSC from

agricultural sector consisted of 16 % while the share of employment in agriculture accounted for 12.26 %. Business entrepreneurs that are profit tax payers, according to the same report, generated a total income of £ 3.227 billion[9].

## Viticulture in Pozega- Slavonia County

Pozega-Slavonia County belongs to the vine region Eastern Continental Croatia, sub-region Slavonia and is composed of three vineyards: Kutjevo (1.288,06 ha), Pakrac (20,23 hectares) and Pozega-Pleternica (116,40 ha). Under the vineyards in the PSC there are 1.424,68 hectares (or 1,649 parcels) and by the comparison of the available data we can conclude that only 3.35% of the total (real) agricultural land Pozega-Slavonia County is used for the purpose of wine growing. On this surface production in 2015th/2016th year was 10.775,09 tons of grapes from which was made 68.562,29 liters of wine (bought black and white). In relation to the agricultural area on which there are permanent vineyards PSC occupies seventh place (out of a total of twenty Croatian counties plus the City of Zagreb), while the production of grapes ranks fourth in same comparison. Although the total number of hectares that are under vineyard lags behind some counties with production volume of grape, wine production surpasses the larger counties (Dubrovnik-Neretva County, Split-Dalmatia County and Zadar County). Additional analysis of available data (PAAFRD) for 2015th it can be concluded that production of fine wine with a geographical indication and a protected designation of origin (VRKZP - premium wine ATC (wine PDO)) winemakers from the analyzed territorial units (PSC) lead at the national level with produced over 10.800,00 hectoliters of wine of high quality.



The production of quality wine with a geographical indication and a protected designation of origin (VKZP - quality wine ATC (wine PDO)) makes a total of 49.397,26 hl which is fourth overall quantity produced at the national level.

| County                 | VRKZP - premium wine ATC (wine PDO) | KVKZP - quality wine ATC (wine PDO) | V - table wine without ESL (with reference to a variety and vintage) | V- wine without PDO | Red wine/rose (hectoliter) | White (hectoliter) |
|------------------------|-------------------------------------|-------------------------------------|--|---------------------|----------------------------|--------------------|
| Požeško-slavonska      | 10.866,27                           | 49.397,26                           | 466,98   | 647,03              | 7.140,75                   | 61.421,54          |
| Istarska               | 7.408,75                            | 50.566,29                           | 3.480,95   | 14.962,59           | 42.821,30                  | 76.803,14          |
| Osječko-baranjska      | 4.320,70                            | 103.614,73                          | 1.101,77   | 879,4               | 26.319,62                  | 110.248,76         |
| Vukovarsko-srijemska   | 4.135,21                            | 58.381,28                           | 19.213,46  | 253,5               | 9.797,21                   | 82.030,45          |
| Dubrovačko-neretvanska | 2.894,19                            | 8.554,69                            | 438,87   | 3.818,26            | 36.200,41                  | 15.782,71          |
| Splitsko-dalmatinska   | 1.958,57                            | 3.783,99                            | 1.997,90   | 12.293,27           | 20.234,73                  | 20.059,83          |
| Virovitičko-podravska  | 1.277,00                            | 5.058,80                            | 122,2  | 1.030,15            | 3.689,55                   | 7.488,15           |
| Zadarska               | 1.223,49                            | 723,31                              | 184,1  | 541,1               | 4.753,05                   | 2.805,90           |
| Zagrebačka             | 1.134,32                            | 9.049,85                            | 15.679,39  | 11.424,95           | 4.467,88                   | 37.381,76          |
| Grad Zagreb            | 778,8                               | 16.418,08                           | 913,6  | 8.719,43            | 7.233,86                   | 26.864,13          |

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Table 9: Production of wine with a geographical indication and a protected designation of origin

By the analysis of data issued by PAAFRD for 2015<sup>th</sup> conclusion was that the national average yield per hectare of vineyards was 5,09 tons of grapes and production of 655,60 liters of wine per ton of grapes. A more detailed analysis of the same data leads to the conclusion that the average yield of grapes in PSC was 7,56 tons per hectare of which is produced 636,30 liters of per ton of grapes. Although higher yields of grapes per unit of surface (hectare) final product (wine) recorded lower production volumes (in relation to the national average). This situation can be partly justified by the high level of produced wines of higher quality (according to the method of organoleptic ranking).

### The potential for viticulture and enology Pozega-Slavonia County

Using available data of the Central Bureau of Statistics and the Paying Agency average prices and yields seven most common cultures that in 2015<sup>th</sup> accounted for the maximum utilization of agricultural land in Pozega-Slavonia County were formed. The analysis of data related to yields and prices of agricultural goods in the period from 2012<sup>th</sup> to 2015<sup>th</sup> (available from the Department of Statistics) calculated by the average value of the yield per unit area (ton per hectare ) and average price per unit mass (kuna per ton).

| Crop    | Average yield ton / hectare | Average value price kuna / ton | Potential kuna |
|---------|-----------------------------|--------------------------------|----------------|
| Corn    | 6,75                        | 1.107,44                       | 7.475,22       |
| Wheat   | 4,65                        | 1.231,71                       | 5.727,45       |
| Soy     | 2,45                        | 2.826,30                       | 6.924,44       |
| Barley  | 3,85                        | 1.254,15                       | 4.828,48       |
| Oats    | 2,88                        | 1.115,58                       | 3.212,87       |
| Tobacco | 1,88                        | 8.540,46                       | 16.056,06      |
| Grapes  | 6,15                        | 4.775,00                       | 29.366,25      |

*Table 10: Potential of income from agriculture crops in PSC*

Rating according to a nominal amount of money that can be achieved per unit of area production of grapes imposed as most profitable. If judged only according to the statistical analysis of the yield per unit area and multiplied by the cost per unit mass conclusion is that production of grapes gave largest amount of potential nominal income. The data listed in the table is the result of the calculation of the average value of the data (prices and yields) published from 2012<sup>th</sup> to 2015<sup>th</sup>. The data is available from the Central Bureau of Statistics and represent the national average for a given period. The emphasis needs to be placed on the fact that the wine growing is labor-intensive branches of agriculture and the share of manual (human) work is higher than field crops. With the use of new technologies and machines ratio of hours of manual labor still exceeds other cultures, which increases production costs. The cost of growing vines may vary between vineyards, and there is no a unique analysis of the production cost of agricultural crops (by public institutions) so that the real amount of profit can vary in relation to this analysis.

### Viticulture and Enology as a generator of economy

Agricultural activity of viticulture and winemaking can have multiple positive impact on regional development. With an industry that follows the grape and wine production (raw materials, machinery, tools, packaging ...) this economic activity can generate the development of other industries. Tourism, education, transport... are some of the industries that their business can lean on the this agricultural sector. Wine tourism is a very important form of tourism, which records a number of benefits for the local community. He achieved multiplier effect through the consumption of visitors which is injected into the local economy ... growth in wine tourism can lead to improvement of infrastructure, services and facilities that use local people, especially in communities where such developments would not otherwise be possible. [10] With a market share that wine production has on the economy of the County (share in GDP in the county, investment, employment ...) this sector gives the possibility of regional development through the tourism sector. Wine product industry creates a platform on which it is possible to achieve a recognizable marketing component for entire County. There is possible further growth of the tourist brand destinations of Požega-Slavonia County with the specific relationship between tourism and its marketing environment means that



it takes a lot more closely reflect and understand the impact of the environment than it is in other areas of economic potential of continental and wine tourism at the local and regional development is indisputable [11]. Currently there is still no clear strategy and then real boom of this segment of the economy is still expected.

Wine is a product that contains highlighted potential for export. This commodity is relatively easy to organize logistically to be available anywhere in the world. By increasing the share of this industry segment there is possibility to open up an export-oriented economy.

## Conclusion

Wine-making and viticulture as part of priority regional development policy in Croatia has a significant share of funded development projects and long-term contributions to sustainable development of the country [12]. This sector has a high market results in spite of a small area of distribution (of the total potential arable land surface in PSC), low representation in the total volume of agricultural crops in the county (3.37%) and lower averages compared to the national average (total area under permanent crops, total production of grapes and wine). Although statistically sector of viticulture and oenology carried out in the PSC does not excels compared to other regions and counties it highlights the amount of production of high quality wine with a geographical indication and a protected designation of origin. The long tradition and expertise, favorable atmospheric conditions, geographic location support the efforts of businessmen in achieving high quality products. Currently the largest single employer in Pozega-Slavonia which operates the real

sector of business activity conducted in the field of viticulture and winemaking.

The potential of viticulture and winemaking in the county is much higher than what is currently being achieved. Analysis of the data has shown that the output of this industry only in grape production is potentially significantly higher than previously realized. If this agriculture sector (vine growing) would be complemented with the segment of production and marketing wine, the economic segment could significantly change the economy of the County. Sector of grape growing and wine making can have multiple effect on other sectors of economy in Pozega-Slavonia County. Other industries can lean on this sector and improve their business. With export potential that is custom with wine making sector development of tourism I PSC is realistic. Relationship between potential tourism brand of the County and local wine supply makes a good platform for united growth of bought commercial sectors.

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