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**ИНВЕСТИЦИИ В ЗЕЛЕНИ ИНОВАЦИИ В СЕКТОР  
ВИНОПРОИЗВОДСТВО И ПОСТИГНАТИ ВТОРИЧНИ ЕФЕКТИ ОТ ТЯХ  
INVESTMENTS IN GREEN INNOVATIONS IN WINE PRODUCING SECTOR  
AND SECOND ORDER EFFECTS**

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**Abstract**

Wine producers are main beneficiaries of EU funding in agriculture of Bulgaria. As the result they become one of the major influencers of local ecology of rural regions of the country. Changes of landscape and exhaust of natural resources are result of wine processing and vine-growing. This research aims to reveal what kind of ecological practices and investments in ecological assets made wineries in South Bulgaria as major beneficiaries of EU funding. There have been analyzed 55 wineries from South Bulgaria. Comparative analysis according to the legal status of the wineries is used as a basic analytic tool. The period of research is 2011-2012. The collected data is provided by own survey. Basic tool for collecting data is inquiry and internal financial reports of wineries. The result of survey is that EU funding has significant contribution in investments in green innovations.

**Key words:** investments, green innovation, wine producing, vine growing, second order effects

**INTRODUCTION**

Wine producers are main beneficiaries of EU funding in agriculture of Bulgaria. As the result, they become one of the major influencers of local ecology of rural regions of the country. Changes of landscape and exhaust of natural resources are result of wine processing and vine growing. Landscape can be a driver for competitiveness of rural economy and for wine sector (Radev, Nikolov 2010). Preserving rural natural resources is key factor for good quality of life and gives contribution to maintain future competitive ability of wine companies and vine growing holdings. That is why investments in green innovation of wine companies have crucial influence on level of competitiveness and creates second order effects like diversification of landscape, preserving natural resources and regional ecology.

This research aims to reveal what kind of green innovations wine companies made in wine making process and what kind of second order effect emerged.

### MATERIALS AND METHODS

Green innovations are categorized into technology, management functions, products design and production process aspects (Tseng, 2012). Green innovations include the process of modifying an existing product design in order to reduce the negative impact on the environment (Chiou, 2011). Green innovations can be classified into three main categories: green product innovation; green process innovation and green managerial innovation (Chen, 2008). Commission of European Communities (2001) defines green product innovation as products that reduce the negative impacts and risk on the environment utilize less resources and prevent waste generation in the supply chain of the product. For the purpose of this study, we define green innovation as a product, process, application and organization that reduce the negative impacts and risk on the environment.

Competitive winery requires good control on whole wine producing process. This includes possession of own vineyards which give opportunity for maximum control of wine value chain. In such way, wineries are enterprises, which integrate vine growing with wine processing, branches with huge influence on ecology and landscape of rural regions (Radev, Nikolov, 2013). According to Raman (2006), (Radev, Vachevska, Ivanov, 2009) in vine-growing, green innovations are practices such as: conservation tillage; integrated nutrient management; crop rotation; organic fertilizers; pipe-drop irrigation (see table 1).

According to survey of Radev (Radev, 2008) the managers of the wine companies state that green innovations in wine processing are: renewable energy system; waste recycle system; resource saving technology (see table 1). Main outcome of investments are minimization of expenditures from manufacturing, enhancement of quality of wine and diversification of risk by creating new value and product such as wine tourism and integration with other branches of rural economy.

**Table 1**  
**Types of green innovations in vine growing and wine producing**

Green innovations in vine growing	Green innovations in wine producing
Conservation tillage; integrated nutrient management; crop rotation; organic fertilizers; pipe-drop irrigation.  (Swift and Woomer, 1992); (Raman, 2006); (Radev, Vachevska, Ivanov, 2009)	Resource saving system; waste recycle system; renewable energy system.  (Radev, 2008)

We investigate 55 wineries from South Bulgaria. Comparative analysis according to the legal status of the wineries is used as a basic analytic tool. The period of research is 2011-2012. The collected data is provided by own survey. Basic tool for collecting data is inquiry and internal financial reports of wineries.

## RESULTS AND DISCUSSION

### Green innovations in vineyard management

In highly competitive market, wineries should keep competitive advantage by integration of wine processing with vine growing. In South Bulgaria all major wineries have established own vineyards using financial support of EU. Vineyards are branch, which also has deep impact on ecology and economy on local scale. These assets of wineries are useful tool for utilize sloping terrains which cannot be used by other crops and also they create landscape value for wine tourism. Vines are highly intensive crop which requires significant investments for building pillar constructions and pipe-line irrigation and pest management. These activities permanently change the landscape and have some negative impacts on ecology – erosion of soil, lost of biodiversity, deforestation, pollution of grand waters etc. According to the basic principles of sustainable development of agriculture, wineries have to use technological practices shown on figure 1.

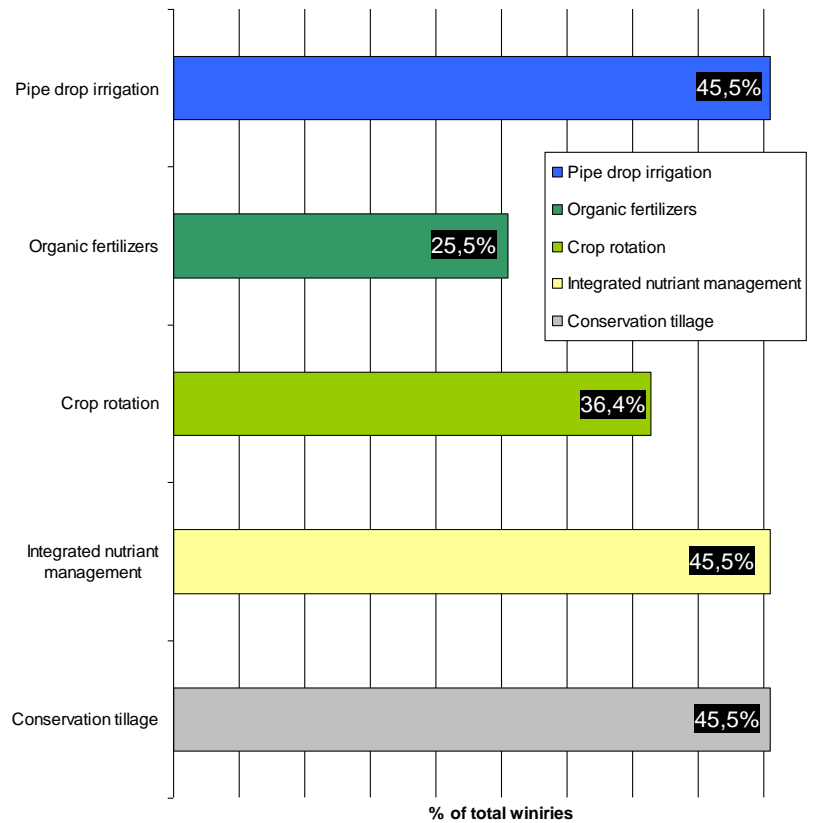
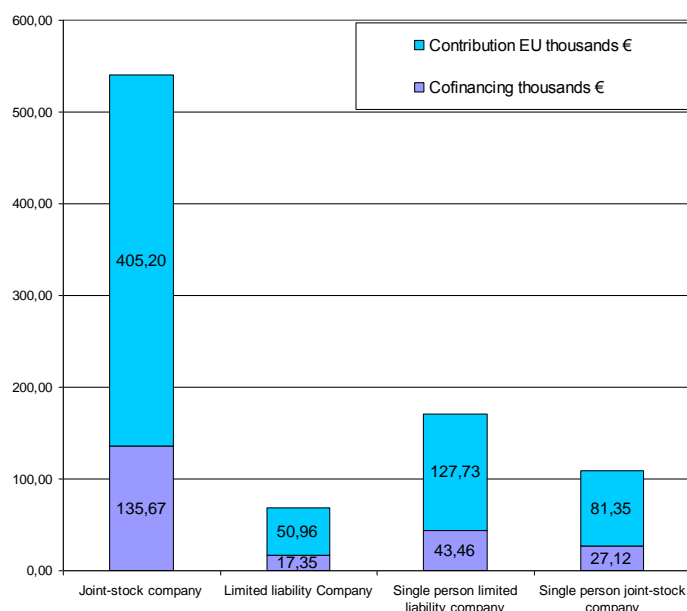


Figure 1. Green innovations in vineyard management

The data shows that conservation tillage is the most preferred green practice – 45.5% of total wineries use it. Pipe-drop irrigation is also preferable practice – 45.5% use it. It is a rule if wineries want to build integrated nutrient system. 45.5% of total wineries use integrated nutrient management to reduce waste of water and enhance the control of soil fertility. 25.5% of wineries use crop rotation as a key factor for improvement of fertility of land soil and optimized used of land. The low relative share of wineries using crop rotation can be explained with the specific feature of vineyards as a crop. Vineyards are long-term asset and cannot be combine easily with other agriculture branches because the vines are labor intensive and need specific type of agricultural machinery. Using organic fertilizers are not very popular green practice among wineries in management of their vineyards. Only 25.5% of wineries use them. The basic reason is that vines are not very proper crop for organic fertilizers.

### Investments in green innovations

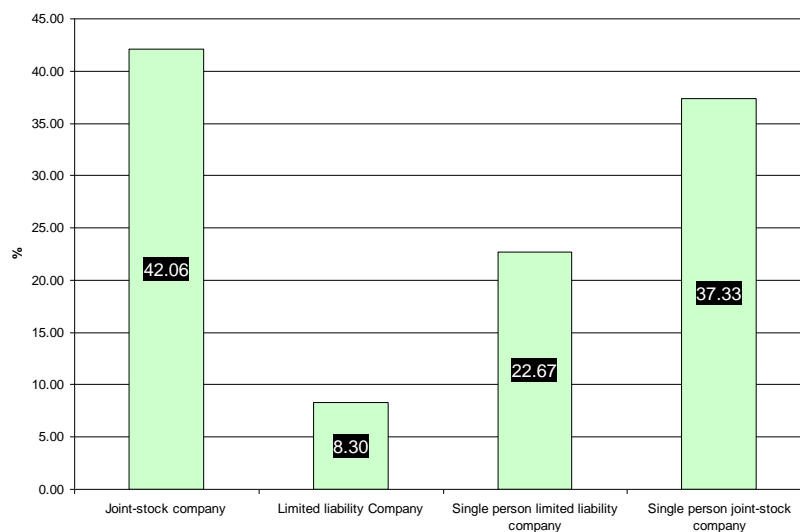
After the integration of the country to the common European market the wine producers have a good opportunity to enhance their competitiveness on global wine market by using EU funds. The competitiveness is achieved by supporting role of EU finance, which aims also to preserve the natural resources and landscape at rural regions. The wineries are one of the most active enterprises whose management succeeded to obtain significant financing from EU funds. The analyzed wineries are divided into four groups according to their legal status. The data shows that joint-stock companies have the largest investments in green innovations, they manage to invest approximately 540.87 thousands € (see fig.2).



**Figure 2. Funding investments in green innovations of wineries**

Of course, these companies can accumulate large sum of finance and can invest them as much as others in wine sector. The single person liability companies are the second group according to the rate of investments in green innovations, they invest average 171.2 thousands €. It is clear that EU contribution to the investments in green innovations is greater than co financing of wineries. It can be explained with better financing conditions of EU programs to the new comers such as Bulgaria.

According to these conditions average contribution of EU financing is 75% of the sum of the project for acquirement of assets. The significance of investments in green innovations of wineries is shown on figure 3. Joint-stock companies invest 42.06% of total investment in ecological assets, followed by single person joint-stock companies with 37.33%. It is obvious that EU funds plays role as a key factor which “pull-up” the investments process.

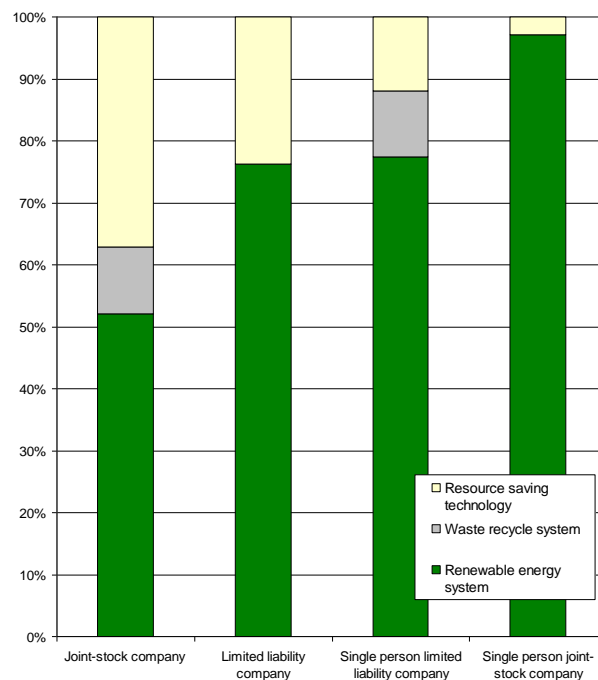


**Figure 3. Relative share of investments in green innovations of wineries of total investments**

### **Green innovations in wine producing**

The structure of investments in green innovations of wineries is shown on figure 4. The chart shows that wineries prefer to invest in renewable energy systems. The single person joint-stock companies are the most active in this field, followed by limited liability companies. Investments in renewable energy system set up more than 50% of total investments in ecological assets. Usually wineries use the produced energy for own needs. Such an investment has a multiple effect on the energy consumption of the winery. Most of wineries diversify their activities, which is reason for consumption of more energy. Branches such as tourism, vineyards, grape growing, distilling and bottling, conservation are using energy.

That's why the management is strongly interested to build own energy system. Improving competitiveness requires reducing costs by adoption of resource saving technologies. Such innovation leads to reduction of resources and negative impacts on ecology. Investments in new saving technologies are second major priority of wineries. Wine producing is a branch, which generate a huge quantity of waste such as labels, wrapping, chemicals, which has negative impact on ecology. The structure of investment of wineries clearly shows that they are not very motivated in building waste recycle systems. Only joint stock and single person limited companies invest in waste recycle system. They allocate 10% of total investments in green innovations.



**Figure 4. Structure of the investments in green innovations of wineries**

### Second order effects

Second order effects from investments in green innovations have positive and negative impact on performance of wine sector, rural economy and preserving landscape.

Positive effects are:

- Diversification of landscape. The composition of local landscape which predominated by vineyards creates value for developing wine tourism;
- Green practice in vineyard management reduce soil erosion and groundwater contamination;
- Preservation of cultural and historical heritage of local community by creating value for wine tourism by investments in vineyards, wine cellars and local trade marks.

Negative effects are:

- Vineyards prevent biodiversity in local areas;
- Vine growing holdings are out of wine value chain because wineries have own vineyards. This have negative social and economic impact on local holdings;
- Huge capital investments in assets such as vineyards, buildings, process innovations increase interest costs. Interest costs have the biggest share in the structure of fixed costs of wineries which makes them more inert to the market requirements.

### **CONCLUSION**

The wineries from South Bulgaria are excellent evidence that EU funding programs can pull up investment activity of ecology and development of rural regions. The survey shows that all wineries use ecological practices in wine processing and vine growing. More than 56% of wineries invest in building of renewable energy system and 34% of them use resource saving technologies. The basic motivator for investing of ecological assets is the greater contribution of EU programs, funding project which integrates ecological with economical purposes. Green innovations take 27.6% of total investments of wineries. These tendencies are positive sign that EU funding policy can change the attitude of management of wineries to the local ecology problems such as preservation of natural resources, effective landscape management and sustainable development of rural economy.

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