PRODUCTION ECONOMICS ESTIMATION ON HOP FARMS

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Abstract

Hops are international trading commodity in agricultural markets. As per acreage of hops - Slovenia is positioned in 2025 as the 5th country on a global hop market. Farmers may acquire accurate estimate of production costs and gross margin (EUR/ha) by participating on workshops for benchmarking of economics at farm level. On workshops in 2025 input data about cultivation technology and production costs as well as revenues related to production and marketing of hops were analyzed from 10 farms for the 2024 growing season. In the paper we illustrate the three key economic parameters related to competitive value of hop farms analyzed. The average group revenue amounted 10,463 EUR/ha, the average group variable costs were assessed as 6,476 EUR/ha and the average gross margin was calculated as 4,169 EUR/ha. The included farmers acknowledged benefits and have thus accepted for the fourth time (since 2021) the presented method of a group assessment of hop production economics at farms level.

Key words: hop industry, farms, costs analysis, gross margin, model PKH

OCENA EKONOMIKE PRIDELAVE HMELJA NA KMETIJAH

Izvleček

Hmelj je mednarodno blago na kmetijskih trgih. V letu 2025 uvrščamo Slovenijo na peto mesto v svetovnem obsegu površin hmeljišč. Hmeljarji lahko za lastno kmetijo pridobijo natančno oceno proizvodnih stroškov in pokritja (EUR/ha) z udeležbo na delavnicah panožnega krožka v hmeljarstvu (PKH). Na dveh delavnicah v letu 2025 smo za rastno sezono 2024 analizirali podatke o tehnologiji pridelave in proizvodnih stroških ter prihodkih, povezanih s proizvodnjo in trženjem hmelja, za 10 kmetij. V prispevku predstavljamo tri ključne ekonomske parametre v povprečnih vrednostih za skupino. Povprečni prihodek skupine je znašal 10.463 EUR/ha, povprečni variabilni stroški skupine so bili ocenjeni na 6.476 EUR/ha, povprečje pokritja pa 4.169 EUR/ha. Sodelujoči hmeljarji že četrto leto (od leta 2021) ocenjujejo udeležbo v panožnem krožku kot koristno za iskanje možnosti boljše organizacije dela na kmetijah.

Ključne besede: hmeljarstvo, kmetije, analiza stroškov, pokritje, model PKH

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1 INTRODUCTION

Monitoring and verification of business performance is essential for effective management and planning of farm development. Existing reference sources in the field of model assessment of agricultural production economics include a wide variety of agricultural policies. The latest printed copy of the Catalogue of Calculations for Planning Farm Management in Slovenia was produced by agricultural consultants and specialists in agricultural economics at the Chamber of Agriculture and Forestry of Slovenia in 2011. It includes model calculations of a gross margin for the purpose of applications for public tenders within the framework of the Rural Development Program 2014-2020. The catalogue was later upgraded with the online application of the agricultural production planning program Farm Manager. The economic efficiency of agricultural production is determined by (a) the yield, (b) the price achieved and (c) payments from CAP measures/subsidies on the revenue side, and (d) production costs on the expenditure side.

As per supply of hops - Slovenia is positioned as the 5th on a global hop market (IHGC, 2025; Pavlovič, 2025). For hop growing, where hops are international trading commodity, a capital and labor-intensive industry, the model calculation method of total production costs is more appropriate than the calculation method of gross margin (Pavlovič, 2014). For a more comprehensive overview of the economic competitiveness of hop farms, it is necessary to consider also farms' other economic activities, which is not the subject of this paper.

A farm can obtain accurate estimate of the revenues and costs of a sector production by participating on the so-called workshops for benchmarking of production economics at farm level. These workshops represent a form of group advisory work in agriculture (Žgajnar et al., 2023). Market-oriented farms, ready to cooperate and exchange their own experiences, can voluntarily join the industry circle. Agricultural economists from research and advisory institutions participate in managing the work at benchmarking workshops and processing the data. Such benchmarking workshops in dairy farming have the longest tradition in Slovenia. In 2021, so called "sector/industry groups/circles" (panožni krožki) in fruit growing and hop growing were also introduced. We economically evaluated the hop production technology using the model - by analyzing farms' revenue, variable costs and a gross margin (Figure 1).

Figure 1: Manual for Benchmarking workshops for farmers, analyzing their economic parameters at farm level (https://www.kgzs-ms.si/wp-content/uploads/2023/09/Prirocnik-za-izvajanje-panoznih-krozkov.pdf)

2 MATERIALS AND METHODS

During workshops with farmers, we used the economic analysis model of hop production from the so-called hop industry circle (PKH). We compared the technological and economic data of the 10 hop farms with the data of the calculated group average from PKH. For the participating Slovenian farms, we used data for the 2024 growing seasons from two workshops, which took place in February 2025.

2.1 Model PKH for assessment of hop economics at farm level

The model is based on the revenue inputs, analysis of variable production costs and the calculation of the gross margin (EUR/ha) of hop production (Figure 2). The model PKH offers pre-prepared standard input data for material, machine and energy costs - to be updated by farmers if needed, while the remaining data is

completed by the hop growers themselves based on their notes and estimates (Pavlovič et al., 2024). The model has six worksheets.

- To enter basic data about the hop production farm, year of data processing, agricultural land in use, hop field areas, variety structure and number of employees on the farm.
- To input data of variable costs (costs of materials, hired labor and energy in hop production).
- To input revenues from (i) hop sales, (ii) potential insurance compensation for natural disasters and (iii) CAP (Common Agricultural Policy) subsidies related to a hop industry at farm level.
- To calculate the variable costs of using machines and attachments in hop production.
- The model PKH offers a calculation of the costs of hop production for the farm in the production year analyzed. The entire calculation with revenues, variable costs and gross margin is shown, which illustrates the economics of production. This calculation is then the basis for reviewing the data in the second, workshop with the same participating farmers.
- To link data between different farms participating in workshops. The data is arranged in columns, where each farm obtains a code (CE1... CE10), which hop growers then use to identify themselves when interpreting the results of the model analysis of the participating farms.

Figure 2: Model PKH for assessment of hop industry economics at farm level (https://www.ihps.si/wp-content/uploads/2023/08/Model-PKH-2025.xlsx)

2.2 Structure and location of farms

Slovenian hop farms that participated in benchmarking workshops in 2025 are multi-generational family farms with a long tradition of hop production. The farms are located in the Styrian growing region. The specific combination of the subalpine climate and soil enables the production of aromatic hop varieties with a worldwide reputation with the PGI 'Styrian hops' designation. The farms are highly specialized in high-quality hop production. The average number of full-time workers is 1.83, and family members often help with farm work.

The participating members grow various varieties of hops on their farms at their own choice, but Slovenian varieties predominate, which are: Aurora, Bobek, Celeia, Savinjski golding, Styrian Wolf. Most of the hop fields are irrigated or have the possibility of irrigation. Hop growers have their own harvesting halls for harvesting the crop. All participating farms have a long tradition, as they are led by the fourth or fifth generation. The members use modern machines, tools and mechanization in their work and thus strive to develop their farms. It is characteristic of hop farms that, in addition to hop growing, they also engage in livestock farming or some other agricultural branch, which also applies to the majority of the participating farms in the hop industry circle.

2.3 Workshops and processing of input data

A group of 10 hop growers participated in the research at the workshops held in 2025. At the first workshop, each hop grower had his own computer with a pre-prepared file with a model PKH for entering data from his own farm (Figure 3). Together, the farmers had entered their own technological and economic data on the revenues and expenses of hop production into the model in a guided manner (Pavlovič et al., 2025).

The workshop was followed by the analyzing of all data from the files of individual farms. The correctness of the data was checked and the farms were coded (CE1...CE10). This was followed by a comparative analysis of the input data with an illustration of the cumulatively calculated average values according to the selected model items. In case of excessive deviation, the data were excluded from the calculation of the average.

Figure 3: A benchmarking workshop with farmers who shared their hop production input data and model results

The second workshop was intended primarily for the presentation of data from individual farms - in comparison with the average values of the group and a discussion of the results obtained. This was followed by an exchange of opinions and a group debate. Participating hop growers looked for reasons for both poor and good results. They shared their experiences on how to improve practices on other farms.

The analyses also include a comparison of data from previous years (Figure 4). Experts in hop industry and economics play a key role in data analyses and in a debate with intention to improve economics of farms.

3 RESULTS AND DISCUSSION

In a results discussion we summarize and point out the following three group average economic parameters related to competitive value of hop farms analyzed for the growing seasons 2024:

- The average group revenue amounted 10,463 EUR/ha,
- the average group variable costs were assessed as 6,476 EUR/ha and
- the average gross margin was calculated as 4,169 EUR/ha.

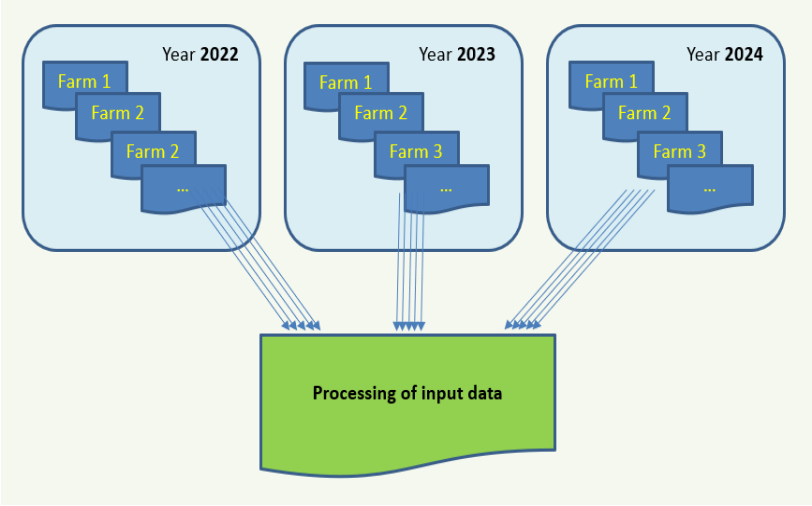

Figure 4: System links of Excel files for economic analyses of hop farms on workshops PKH

Summarized from the group costs analysis, the model PKH illustrated average output data on acreage (15 ha), hop yield (1,553 kg/ha) and hop price (6.04 EUR/kg) as well as major hop production variable cost groups such as stringing material (249 EUR/ha), manure and fertilizers (631 EUR/ha), energy for drying hops (751 EUR/ha), plant protection material (813 EU/ha), hired seasonal labor (1,718 EUR/ha) and mechanization

(955 EUR/ha) related to farms analyzed within the benchmarking workshop evaluation (Pavlovič and Trpin Švikart, 2025).

The tables with workshops benchmarking results in detail (not included in this paper) are useful to determine whether the reason for the above-average successful farm in terms of gross margin (EUR/ha) is the highest yield and the highest selling price of hops. If we compare the data of all farms analyzed, we see that one farm may have the highest gross margin as the sum of average variable costs, above-average hop yield and slightly above-average selling price of hops. We may find out that the farm that is most successful in terms of gross margin may not necessarily have the highest yield per hectare and the highest selling price of hops. The level of variable costs counts and plays a key role, as well.

The included farmers acknowledged benefits and have thus accepted for the fourth time (since 2021) the presented methodological approach of a group assessment of hop production economics at farms level.

4 CONCLUSIONS

The benefits of the camaraderie and freedom to participate in workshops and to discuss the issues of the production technique and economics in a hop industry, whatever they may be, far outweigh the costs and limitations of such workshop activities. The workshop participants approved benefits and have thus accepted for the fourth time (since 2021) the method of a group assessment of hop production economics at farms level – in original Slovenian called as “panožni krožek v hmeljarstvu”.

In fact, the greater the understanding by workshop members about their economic situation in the global market creates a more cohesive national sector industry. Furthermore, it increases awareness of members regarding the global market situation of the day (macro-economic) as well as at their farm level (micro-economic) providing information to which they may not otherwise have access so they may act and respond should they so choose.

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Data Availability

Data are available from the corresponding author upon a reasonable request.

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