COMBINING HOP PRODUCTION WITH FRUIT PRODUCTION ON HOP FARM

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Summary
The impact of combining hop production with apple production on hop farm was analysed in terms of labour and machinery resources, costs and profitability of production. The analysis was conducted with the aid of the Agroefekt program, developed at the Institute of Soil Science and Plant Cultivation of Puławy. Appropriate operation sheets of apple production and hop production were used.

The results of the analysis of labour and power resources and requirements for hop garden and orchard have shown that the main labour peaks do not overlay, making it possible to combine both types of production. Economic analysis has shown that at the current level of prices apples have higher profitability than hops. Combining the two crops is a certain method to rise the overall profitability of the hop farm. However, costs of establishing and outfitting an orchard are high and the farmer will have to wait a few years for the returns of such investment.

1. INTRODUCTION

Due to low prices for produce, hop production in some countries has been going through a crisis in recent years. Some hop growers try to alleviate this condition by transplanting the entire hop garden with a higher yielding variety of hops. Another method is to find complementary crops, which are much more profitable than hops.

The most important aspect of combining any two types of agricultural production is their joint impact on labour and machinery resources. Zaliwski and Hołaj (1992) report that such a complementary crop for hops could be fruit. They had analysed a merge of a hop growing farm with a fruit growing farm, in which main crop were cherries, plums and apples, and found that the two types of farm were complementary in terms of labour and power resources. However, the analysis concerned state farms and did not give any details on how profitability could have been affected by the merge. Hop growing farms in Poland are mostly family farms and therefore it is important not only to analyse profitability of such a venture but also its influence on the farmer’s own labour resources as well as hired labour.

2. MATERIALS AND PROCEDURES

Some assumptions had to be made in order to investigate closer the problem of combining two types of production. One of the most labour-demanding periods for hops is harvest (Migdal 1996). Hops are ready for harvest at the end of August and it was assumed that apples would be taken into account as they ripen much later giving a sufficient time margin. The Idared variety was selected for analysis, as it is a late variety (ripens after September). The analysis was done for a 10 ha hop garden yielding 1.5 tons of hop cones per hectare and a 5 ha orchard yielding 4 tons of apples per hectare. It was assumed that the orchard would have the area 5 ha since orchards of much smaller area could not provide area could not provide a sufficiently big profit to support the hop farm. A bigger area would not be feasible in terms of investment and existing labour and machinery resources. The farmer’s own labour resources were 10 hours a day, Sundays excluded. Power resources were
in the form of two 0.9 t tractors. These resources were analysed in 15 periods of unequal length into which the year was divided. The periods were determined according to the character of hop production (Zaliwski and Holaj, 1992). Sundays were excluded from the periods.

The Agroefekt modelling tool, developed at the IUNG (Institute of Soil Science and Plant Cultivation of Pulawy) was used for the analysis (Holaj and Zaliwski, 1999). The program requires operation sheets of crops cultivated for making calculations. The hop production sheet was borrowed from the parallel work (Holaj and Zaliwski, 1999). The apple production sheet was developed at the IUNG. For the economic analysis 1998 prices were used. Direct costs were calculated on the basis of the operation sheets. Indirect costs were assumed to be 25% of the total costs of production. The methodology of economic analysis is incorporated into the AGROEFEKT program and has been based on the available literature (Adamowski 1977, Lorencowicz 1987, Witney 1984) and some other methodology sources.

3. RESULTS AND DISCUSSION

Three separate objectives have been sought in the analysis. First, labour and power resources and requirements were calculated. Next, an analysis of the farmer’s own labour resources was conducted to investigate how the venture would affect them. Finally, a cost and profit analysis was conducted to see how profitable such a venture could be to the farmer.

![Diagram](image.png)

Fig. 1 Labour resources and requirements in periods in hop garden (10 ha) and apple orchard (5 ha)

The results of the analysis of labour and power resources and requirements are shown in fig. 1, 2 and 3. In chart in fig. 1 along with labour requirements for hops and apples production also the lengths of periods are shown. Sundays were excluded from the periods, so their total is less then number of days in the year. From the chart in fig. 1 it follows that the main labour peaks in hops production are in period 5 (shoot training) and 12 (harvest), but the hop farmer needs hired labour also in periods 4, 6, 8 and 13. In period 5 the farmer should hire 16 farm hands and in period 12 the number of hired farm hands should be around 10. One
person on the other hand can almost run the entire orchard; the farmer would need very little hired labour in periods 2, 3 and 4 (tree trimming) and some more in periods 13 and 14 (harvest). It is important to observe that the main peaks for the two crops do not overlay.

Fig. 2  Labour resources and joint labour requirements in hop garden (10 ha) and apple orchard (5 ha) in periods

In fig. 2 labour requirements jointly for hop garden and orchard are presented. It becomes apparent that an orchard complements a hop garden in a very suitable way. Even a much bigger area than 5 ha would be appropriate for combining the two types of production as far joint labour requirements are concerned because it would smooth the peaks further.

Fig. 3  Power resources and requirements in periods per day in hop garden (10 ha) and apple orchard (5 ha)

Power resources and requirements are presented in fig. 3 jointly for hop garden and orchard. It is evident that the farmer could do all the jobs necessary for apple-growing with the two tractors he has at disposal on the farm for hops production. In fact, power resources are ample and would support even a much larger orchard.
In fig. 4 farmer’s own labour in periods in hop garden, apple orchard and jointly is presented. The calculations of the farmer’s own work are based on the dates of operations in operation sheets and made to comply with a 10 hours’ working day. Farmer’s own labour does not reach the 10 hours’ level in any period because the time for most of the operations is limited and is rather short in comparison with the length of periods.

This becomes more obvious from fig. 5 where farmer’s own labour is shown for each day for one of the periods. The operation of shoot training ends on 7 May and the 8th the farmer would have nothing to do.

From fig. 4 it follows that if the two crops are combined the farmer will have periods of work more evenly spread. He could spend about 1250 hours on hop growing, in an orchard about 1180 hours and to cultivate both crops he could work about 1770 hours. It means that the possible savings in the last case are about 520 working hours. The rest of the work would have to be done by hired farm labour.
In fig. 6 costs of production per hectare in division into various categories are presented. From this chart it follows that costs of production of hops are almost equal to the costs of production of apples. Large part of these costs is the cost of materials, machines and tractors (cost of labour is very low because of low pay).

![Fig. 6 Costs of production in hop garden (10 ha), apple orchard (5 ha) and jointly](image)

In fig. 7 the value of production and net income per hour of farmer’s own labour are shown. From the graph it follows that the primary cause of low profitability of hops production is high cost of production and low value of production as compared with apples, for instance.

![Fig. 7 Value of production and net income per hour of farmer’s own work for hop garden (10 ha), apple orchard (5 ha) and jointly](image)

From fig. 7 it follows that apples give much higher value of production than hops. Because of this and lower costs of production the net income per hour of the farmer’s own work they give is much better. Nevertheless, before hop growers start to establish new orchards they have to bear in mind that the cost of planting the orchard is rather high. Also, they will have to wait for some years before the orchard reaches its full yield. Furthermore, some storage for apples is necessary if they are not intended to be sold immediately after picking. That could cost at least 100,000 zł. And lastly the farmer would have to expend over
70,000 zł for new machinery which are specific to apple-growing, 80% of which would go for the purchase of bins to hold apples at harvest and in storing.

4. CONCLUSION

The results of the analysis of labour and power resources and requirements for hop garden and orchard have shown that the main labour peaks do not overlay, making it possible to combine both types of production. Economic analysis has shown that at the current level of prices apples have higher profitability than hops. Combining the two crops is a certain method to rise the overall profitability of the hop farm. However, costs of establishing and outfitting an orchard are high and the farmer will have to wait a few years for the returns of such investment.

5. REFERENCES