

PRODUCTION COSTS AND PROFITABILITY OF THREE POTATO VARIETIES: LORD, VINETA AND JELLY IN YEARS 2011-2012

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Abstract

The paper Farm incomes in Poland vary substantially, which is entirely confirmed by the results of agricultural accounting in Polish FADN. The income is influenced by a range of factors of which the most important are natural conditions, the farm production potential, production intensity as well as subsidies under the Common Agricultural Policy. The increase in potato production on the European market has caused a low price level. In some countries the decline in prices was even 15% in 2010. The decline in prices led to the decline in profitability of potato production because low prices obtained by producers entailed higher costs of potato production. This work shows research results from years 2011-2013. The aim of the research was to compare the profitability of edible potato production on an individual farm in the Łódź Province in the early and late harvesting of the analysed years. The data needed to estimate the profitability were obtained based on the data included in the report which an individual farm runs in order to determine the profitability of the application of new cultivation technique or new varieties. Based on the obtained data, direct and indirect costs as well as profit were calculated. The profitability estimated on the basis of the data collected from the farmer was compared to the profitability which would be achieved by the farmer on the basis of the percentage of direct and indirect costs provided by the Institute of Agricultural and Food Economics. The profitability calculated on the basis of indicators of the Institute of Agricultural and Food Economics was lower than the profitability estimated on the basis of the data obtained from the analysis of the farm financial report.

Key words: costs, cultivation, potato, profitability, varieties

INTRODUCTION

The potato (*Solanum tuberosum* L.) belongs to the most important arable crops for the world economy. The current global potato production amounts to over 320 million tons and for many years it has shown an upward trend. Poland is the sixth biggest producer of potato in the world and the third in Europe. In Poland the potato holds a special position, also yielding on low-quality soils which constitute a substantial part in the structure of arable land. The potato cultivation in a rational crop rotation causes soil loosening, weeding, and reduction in the growth of pathogens. It also prevents soil degradation, improves soil fertility and increases the yield of subsequent plants. The potato is a widely used crop. It is a vital foodstuff, a component of feed and an industrial raw material. During

the last decade a significant decrease in the land used for potato cultivation has been observed. In 1997 the potato was cultivated on 1,300,000 hectares whereas in 2007 on about 570,000 hectares (a reduction of more than 56%) [9],[10]. In that period, average yields per hectare did not increase significantly and ranged between 15 - 20 tons/hectare. Such a significant drop in potato cultivation in Poland was caused by several factors of which the most important are: marginalisation of potato's significance as the feed for pigs, the decrease in the profitability of some production areas (low prices of edible potatoes, low profitability of seed potato production, disappearance of spirit production depending on potato, starch amounts - drop in the production of starch potato) and increasing requirements in a wider potato industry [9]. All this results in the fact that

major producers look for ways of increasing the quality and quantity of produced potatoes. The level of potato crop depends to a high degree on the choice of variety, but the size and quality of potato tubers also depends on the applied agrotechnology. Market demands influence the crop area, yields and destination of potato [5],[6]. Over the years potato crop area as well as potato harvest and yields have changed.

MATERIALS AND METHODS

This work presents research results from years 2011 – 2012. The objective was to compare the profitability of potato growing depending on the time of harvesting on an individual farm in the Łódź Province in the analysed years. The total farm area is 120 ha dominated by potato cultivation and cereals. The data needed to calculate the profitability was obtained on the basis of information from the report run by a given farm in order to determine the profitability of application of new cultivating techniques or new varieties. Based on the collected data, direct and indirect costs as well as profit were calculated. The profitability calculated based on the data obtained from the farmer was compared to the profitability which the farmer would achieve based on the percentage of direct and indirect costs provided by the Institute of Agricultural and Food Economics [1],[2]. The economic viability estimated on the basis of indicators of the Institute of Agricultural and Food Economics was lower than the one obtained from the analysis of the farm financial report.

RESULTS AND DISCUSSIONS

Tables 1, 2 and 3 show costs and profitability of potato cultivation depending on how early the potato variety is. In both early and late varieties, the purchasing cost of the planting material represents the biggest part of direct costs. The cost results from an incredibly high price of planting material in years 2010-2012. Following the methodology of cost calculation of this economic category, the calculation of labour costs of the farmer and

his family was not included.

Table 1. Cost and income calculations of the Lord potato variety cultivation in PLN per hectare (the average over years 2011 – 2012)

No.	Specification	Amount	Price	Value
1	Value of Production			26002.6
1.1	Main Production	30	850	25500.0
1.2	Direct Subsidy			502.60
1.3	Planting Material	3.5	1500	5250.0
2	Mineral Fertilization			1656.8
3	Plant Protection Products			933.25
4	Direct Costs		43%	7840.05
5	Direct Surplus			18162.6
6	Direct Surplus without Subsidies			17660.0
7	Indirect Costs		57%	10392.6
8	Total Costs			18232.7
9	Production Cost of 1 ton			607.8
10	Operating Income without Subsidies			7267.3
11	Operating Income with Subsidies			7769.9

Source: Author's analysis

In the last 15 years the structure of potato use has changed significantly [3]. Although the leading position in previous years - potatoes used for feed - still constitutes about 30% of the total production, it is only 4 million tons in absolute figures compared to 30 million tons in the past decades [4]. Apart from the calculation of costs, the basis for the calculation of potato production profitability is the potato price for a given year, which depends mostly on potato yields and potato production area in respect of the whole country. In the case of the Lord variety (early variety) the income obtained from one hectare was the highest both with and without direct subsidies. It is mainly connected with the fact

that in the period from June to July potato prices on the domestic market are the highest compared to the prices in the subsequent months. It should also be mentioned that in analysed year 2011 the potato price was much higher than in following year 2012. In the case of late varieties, the profitability is lower, whereas the yield which compensates the lower price is higher.

Table 2. Cost and income calculations of the Vineta potato variety cultivation in PLN per hectare (the average over years 2011 – 2012)

No.	Specification	Amount	Price	Value
1	Value of Production			24102.6
1.1	Main Production	40	590	23600
1.2	Direct Subsidy			502.6
1.3	Planting Material	3.5	1500	5250.0
2	Mineral Fertilization			1656.8
3	Plant Protection Products			933.25
4	Direct Costs		43%	7840.05
5	Direct Surplus			16262.6
6	Direct Surplus without Subsidies			15760.0
7	Indirect Costs		57%	10392.6
8	Total Costs			18232.7
9	Production Cost of 1 ton			455.8
10	Operating Income without Subsidies			5367.3
11	Operating Income with Subsidies			5869.9

Source: Author's analysis

We commercially process less than 2 million tons of potato, which is about half less than in the 1970s. The distilling industry has decreased significantly becoming ten times lower. We process several times less potato in starching. Since the 1990s potato processing for food preparations has increased almost six times. Potato production in Poland, as in other European countries, becomes completely dependent on the customer the quality of

potato must be perfectly suited to the direction of use.

Table 3. Cost and income calculations of the Jelly potato variety cultivation in PLN per hectare (the average over years 2011 – 2012)

No.	Specification	Amount	Price	Value
1.	Value of Production			23902.6
1.1	Main Production	39	600	23400
1.2	Direct Subsidy			502.6
1.3	Planting Material	3.5	1500	5250.0
2.	Mineral Fertilization			1656.8
3	Plant Protection Products			933.25
4	Direct Costs		43%	7840.05
5	Direct Surplus			16062.6
6	Direct Surplus without Subsidies			15560.0
7	Indirect Costs		57%	10392.6
8	Total Costs			18232.7
9	Production Cost of 1 ton			467.5
10	Operating Income without Subsidies			5167.3
11	Operating Income with Subsidies			5669.9

Source: Author's analysis

Among agrotechnological factors determining the amount and quality of potato yield are the following: growing site, soil cultivation, organic and mineral fertilization, health of seed potatoes, time and technology of planting, proper care and protection [7],[8]. Spring soil cultivation for potatoes is aimed at limiting water losses from winter stocks, accelerating the heating of soil, thorough mixing of soil with mineral fertilizers and providing optimal conditions for planters [1], [2]. Potato is a widely cultivated crop, which causes numerous problems connected with its production, dissemination of the technological and biological progress as well as organization of potato purchasing for consumption and processing.

CONCLUSIONS

The level of production costs of edible potatoes depends mainly on the applied farming methods, the potato variety and the conditions for growth, which the farmer has less influence on. The direct surplus being the resultant value of production and direct production costs constitutes the most important feature necessary to assess the economic viability of edible potato production by variety. The highest direct costs incurred during the production of individual varieties of potato were connected with purchasing a certified planting material. The best production result is achieved in late varieties of potato whereas the best economic result, i.e. the most satisfying for the farmer, is achieved in early varieties cultivated with the application of proper agrotechnology and protection.

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