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## KNOWLEDGE AND APPLICATION OF METHODS AND SYSTEMS QUALITY ASSURANCE IN ORCHARD FARMS IN POLAND

**Abstract:** Poland is significant producer of fruits in Europe. After accession to the EU, fruit producers are obligated to comply with operative rules and standards on this market which are related to ensuring commercial and healthcare products of appropriate quality. The quality of fruits available on the market is varied. This results from the fact that in the past, in domestic horticulture, more attention was paid to enlargement of the acreage, the modernization of orchards, increasing the intensity of production and productivity than on issues related to certification and quality management systems. Therefore, the aim of the work was to show the producer's opinion on methods and systems which assure quality of fruits. It was stated that producers have a good knowledge of the methods and systems of fruit quality assurance. Knowledge of these issues is significantly associated with the scale of the fruit production. The knowledge of the principles of integrated fruit production and trading standards GLOBALG.A.P. was declared most often. These methods of quality assurance were also top rated by producers and implemented mostly in farms.

**Keywords:** methods and systems quality assurance, Orchard farms, application

### 1. Introduction

Changes in food law and increase in consumer requirements cause the fact that the producers and traders organizations more often see the need to identify and monitor food safety hazards and to provide consumers with adequate proof. It causes the need to implement and develop methods and systems of quality assurance and food safety in enterprises that want to participate in the world trade.

In the European and global markets, the issue of overproduction of fruits, especially apples, and the downward trend in consumption are discussed more and more often. Under these conditions, confirmed high merchantable and health quality of fruits, in addition to price and ability to prepare adequate and uniform consignment of products can be an important element in the creation of the competitive advantage. Practice shows that the certificate and quality barriers can effectively hinder access of fruits to the EU and the world markets. Therefore, the knowledge of methods and quality assurance systems in the primary production and their use are very important.

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The aim of this study was to examine the producers opinion on the methods and systems which assure quality of fruits. Knowledge of these opinions and their determinants is important because of shaping the policy concerning this branch of horticulture.

## 2. Material and methods

Opinions of fruit growers from all over the country were gathered on the basis of surveys. The study was conducted using postal questionnaire method in 2007. Out of all of the sent questionnaires, 61 were returned (20%) completed.

- The survey questions concerned selected elements of fruit farms characteristics, such as location, area of fruit crops, cultivated species and fruit crops, membership in a group of producers, the way of storing fruits and fruit sales trends. The paper discussed the results of the four questions raised in the questionnaire, concerning: general knowledge of methods and systems of the fruit quality assurance.
- the importance of various methods and systems of the fruit quality assurance,
- declaration concerning the application of methods and systems of the fruit quality assurance and
- the intention to implement them on the farm in one year time.

Questions about the knowledge and importance were denoted in the ordinal scale, and questions regarding the application of selected methods of the fruit quality assurance were denoted in the nominal scale.

In the data analysis, the author has used descriptive statistics and measures of correlation (Pearson Correlation Coefficient). The conducted statistical analysis included three levels of test significance:  $\alpha < 0.05$  \*,  $\alpha < 0.01$ , \*\*,  $\alpha < 0.001$  \*\*\*.

Selected elements of characteristic of the surveyed fruit farms are presented in Table 1. The cultivated area of fruit ranged from 1.3 to 160.3 hectares, and the average was 24.5 hectares. The Standard deviation (SD) from the average of the surface between selected farms was 25.4 hectares. In 2005-2007, fruit crops were ranged from 9 to 2,839 tons, the average was 415.4 tons. Over 44% of the surveyed farms were members of groups of fruit producers. The structure of the crop was dominated by apple trees that were grown in over 90% of farms. Other species of fruit plants were grown significantly rarely.

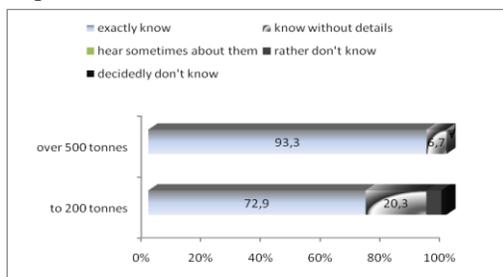
**Table 1.** Selected characteristics of the surveyed fruit farms

Specification	Type of measurement	Value
Area of orchard (hectare)	from-to average SD	1,3- 160,3 24,5 25,4
Fruit crops (tons) in the years 2005-2007	from-to average SD	9-2839 415,4 433,1
Membership in producers group	Indications in per cent	44,3
Cultivated species: Apple Pears Plums Sour cherries Cherries Raspberries Currants Gooseberries and strawberries Other species	Indications in per cent	90,2 41,0 24,6 42,6 23,0 11,5 19,7 8,2 21,3

## 3. Results

It was found that over 71% of questioned producers know exactly at least one of the

methods or systems of the fruit quality assurance, and 22% know it without the details (Figure 1). Producers' statements were related to the scale of the fruit production. Knowledge of the details connected with the introduction of methods or systems of fruit quality assurance have been increasing along with the scale of production, as having a thorough knowledge in this area was reported by 57% of producers who produced up to 100 tons of fruits, and over 93% - more than 500 tons. Such a distribution of producers' opinions is related to differences in the directions of selling fruits from farms of different scales of production.

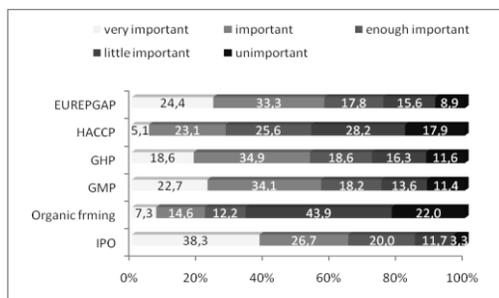


**Figure 1.** Declaration of knowledge of methods or systems of fruit quality and safety assurance depending on the size of the fruit production (indications in per cent)

The knowledge of the principles of the integrated fruit production and trading standard EUREPGAP was declared most often (now GLOBALGAP), and the system assuring food safety HACCP and others like GMP/GHP system, ISO 22000 regulations, the standards meet the requirements of large retail chains such as BRC (British Retail Consortium) and IFS (International Food Standard), Tesco's Nature Choice, QS (Qualität und Sicherheit), IP (Identity Preservation), etc. were declared more rarely. In Western Europe, the integrated fruit production (IPO) is a obligatory standard in many crop fields, for example in Italy, Germany, Switzerland, France, the Netherlands and Austria, where 70-90% of apples are produced by integrated method (Niemczyk, 2004). In Poland, the

organization of integrated production was initiated just in 1990 in the Research Institute of Pomology and Floriculture in Skierniewice. In 1991-1995, the rules were implemented only in the integrated production of apple orchards, and since 1995 in other crops, like strawberries (1995), pears (1997), cherries (1999), currants (2002), raspberries and blueberry (2003). Because of the small interest of consumers in fruits from the IPO, a small number of groups and producers' organizations and the lack of highly qualified consultants, the development of these crops in Poland is slow (Olszak *et al.*, 2004).

Dąbrowski and Maciejewski (2010) showed significant differences in knowledge of principles of integrated fruit cultivation and plant protection, depending on the farm location in the country and cultivated species. Growers from the Grójec and Warka districts producing apples were more aware of the principles of integrated plant protection than the producers of black currant, cherry and strawberry.



**Figure 2.** Producer's opinion about importance of methods and systems of fruit quality and safety assurance (indications in per cent)

According to the surveyed fruit growers, the importance of individual methods and systems assuring fruit quality and safety is varied (Figure 2). The ownership of Integrated Production of Fruits and commercial EUREPGAP standard (GLOBALGAP), which is well known in Poland, especially for producers who supply

fruits to the German supermarkets: METRO, Tesco, Ahod, suppliers: Fruitmasters, The Greenery, Grodan, Mc Donalds Europe and others, was rated the highest. EUREPGAP standard was introduced in 1997. It combines the principles of Good Agricultural Practices (GAP), HACCP system and integrated production methods. The way of production is certified from the moment of the purchase of trees, shrubs or seedlings of fruit plants to produce the final product (EUREPGAP, 2004). In this assessment, the production of organic fruits (2.7) achieved the lowest average validity. Low assessment of organic production is confusing because of the great fragmentation of fruit production in Poland, its relatively low intensity, as well as rapid growing rate of interest and demand on organic products and possibilities of obtaining financial support per hectare on organically growing crops as part of Axis 2 of the PROW operating program in the years 2007-2013. The amount of payments is quite attractive, and ranges from 650 to 1800 PLN per hectare depending on the species and possible possession of the certificate (Rural Development Programme, 2007-2013). The reason for the ratings being so low might be the way of selecting a sample of surveyed farms. The vast majority of producers were members of The Society for Promotion of Dwarf Fruit Orchards, which brings together more than 300 producers from all over the country, many of whom have orchards conducted in the intensive way and on the high European level. Producers view about the importance of various methods and systems assuring fruits quality were correlated with the area of fruit cultivation and harvesting of fruit, as well as with membership in a group of producers and ways of fruit storage (Table 2).

The membership in a group of producers was associated with significantly higher evaluation of IPO, GMP and GHP systems. The importance of organic production was decreasing as the scale of production was simultaneously increasing and was

significantly correlated with the location of the farm in the country.

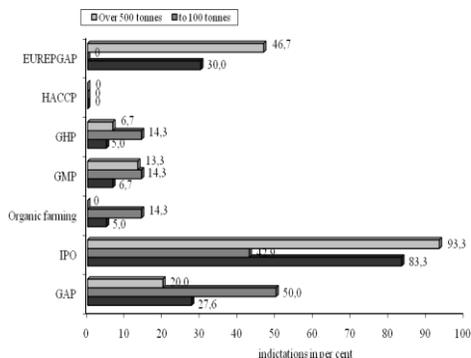
**Table 2.** Pearson correlation coefficients for variables described importance of particular methods and systems of fruit quality assurance\* and some features characterizing orchard farms

Specification	Voivodeship	Area of orchard	Fruit crops	Membership in producers
IPO	0,11	-0,15	-0,02	0,26*
Organic farming	0,38**	-0,44***	-0,38**	-0,12
GMP	-0,05	-0,09	-0,05	0,42***
GHP	0,04	-0,00	0,05	0,27*
HACCP	0,09	-0,01	0,05	0,17
EUREPGAP GLOBALG.A.P	-0,03	0,02	-0,03	0,27

\*1- unimportant, 2- less important, 3- important enough, 4- important, 5- very important. Significance correlations  $\alpha < 0,05$ \*;  $\alpha < 0,01$ \*\*;  $\alpha < 0,001$ \*\*\*

Out of all of the aforementioned methods and systems of fruit quality assurance, Integrated Fruit Production, EUREPGAP standard and Good Agricultural Practice in fruit farms were implemented most often. Occasionally, GMP and GHP systems and organic fruit production were used. Other methods and systems for quality and safety

assurance of the fruits was not applied (Figure 3).



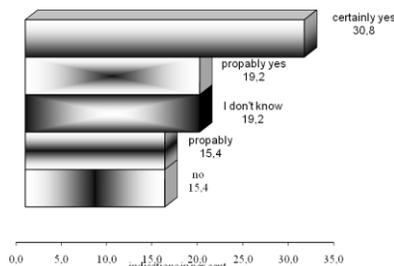
**Figure 3.** Declaration of the use of some methods and systems fruit quality and safety assurance (indications in per cent)

Integrated Production popularity may stem from the fact that its implementation is a necessary condition for obtaining other certificates of quality, including EUREPGAP standard (GLOBALG.AP), which is required in the trade in many countries of the European Union. Application of the various methods and systems of the fruit quality assurance was significantly correlated with the membership in a group of producers, selling fruit directions, the method of storage and harvest and length of fruit storage, depending on equipping with storage building and species of cultivated fruits.

The integrated fruit production (IPO) system has been used by the respondents in different years since 1990, the principles of Good Agricultural Practice has been used since 2003, the EUREPGAP standard since 2004, and the methods of the organic fruits production since 2005. Exporters of fruits and sellers to supermarket chains and wholesalers implemented the EUREPGAP standard (respectively 34.8, 31.3% of responses, compared to 14.3% among non-exporters, and 7.7% for the stores selling fruit vegetables at markets and stalls) in their farms significantly more often than other producers. The ones who were producing

over 500 tons of fruit and fruit growers were gathered in groups of growers producing significantly more often than ones who produced up to 100 tons of fruit and non-members were using the principles of integrated production of fruits and EUREPGAP standard (respectively 93.3 and 46.7 % to 42.9 and 0.0 % and 85.2 , 59.3 % to 81.8 and 6.1% of responses) Figure 3.

In the future, almost 31% of respondents intend to implement the system of fruit quality assurance in the farm, more than 19% are likely to do it and just as many are still undecided. Producers' statements were not significantly related to any researched feature of the farms (Figure 4).



**Figure 4.** Producers' opinion about intention of introduction system of fruit quality and safety assurance in farms (indications in per cent)

Among many systems that can be implemented at primary production stage, the intention to implement the EUREPGAP commercial standard (40% of responses) and IPO (33.3% indications) was declared the most often. About 20% of farms intend to switch to organic production, and 6.7% to implement the HACCP system. The popularity of the implementation of the principles of organic production may result from a desire to improve the profitability of production and use of support under the agricultural and environmental programs funded by the EU. Small popularity of the HACCP system at the stage of primary production may result from the high labor consumption and costs of the

implementation of this system, lack of consumers' requirements and minor differences in the prices of the certified products and products from the conventional crops.

#### 4. Conclusions

1. Knowledge of methods and systems fruit quality assurance is growing among producers together with the scale of production. It is related with the differences in the distribution of fruits from farms of various sizes.
2. According to the fruit producers, the most important are IPO and the EUREPGAP standard. The importance of

the individual methods and systems fruit quality assurance significantly differentiate: the location of the farm, the area under fruit and fruit crops, as well as membership in a group of producers and storage methods and selling fruit directions.

3. Among many methods and systems for ensuring the quality of fruits that can be used at the stage of primary production on farms, the ones that were implemented the most often were Integrated Fruit Production, EUREPGAP standard. The Good Agricultural Practice principles have also been used. Their use is now mandatory for farmers receiving support from the EU funds.

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