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## DETERMINANTS OF FRUIT QUALITY SYSTEM IMPLEMENTATION IN POLAND

### S u m m a r y

A commercial GLOBALG.A.P. standard and an integrated production system are the most popular methods to ensure the quality and safety of fruits. The implementation thereof in fruit farms is a consequence of food law requirements and expectations of consumers who want to consume products that are of high quality and, in the first place, safe for health. The implementation of those quality assurance (QA) methods is a prerequisite for selling products to large international retail chains at home and abroad. Motives for and barriers to application of QA methods were identified based on a survey of fruit growers, including those who implemented a GLOBALG.A.P. standard, and on interviews with experts. It was found that the major motives for implementing QA systems in orchard farms in Poland were the following: increased sale opportunities, entering new markets with products, and meeting customer requirements. Amidst the major barriers were the lack of economic incentives and the lack of knowledge about the methods and systems of quality assurance.

**Key words:** orchard farms, systems of quality, implementation, GLOBALG.A.P.

### Introduction

An integrated production and a commercial GLOBALG.A.P. standard are most popular in the production of fruits [7]. Fruit farms implement them because they are obliged to do so by requirements of the current food law in force (with regard to liability for unsafe products) and because consumers want to consume products of high quality and, in the first place, safe for health [1, 6]. Moreover, the implementation of QA methods results in obtaining the trade partner position and increases the competitiveness in the domestic and international market. According to what Hermaniuk and

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Sikora [4] say, the quality of products as well as the quality of management process has a positive impact on the growth of client/customer trust in the producer and, also, on many other aspects of running a business. From the point of view of food safety and reduced risks, the pressure to standardize quality in the primary processes and food industry has become important. Therefore, quality assurance will capture the process of food production and distribution [16]. Producers who could prove they had made every effort to meet the demands of customers in terms of quality and safety of their products have got the advantage in the competitive horticultural market. Moreover, it is very important to identify external and internal conditions for implementing those systems as well as to determine the existing barriers. This knowledge can support actions intended to meet legal requirements and to increase the competitiveness of fruit farms in the global market.

The objective of the research study was to identify motives of and barriers to the implementation of QA methods and systems in orchard farms in Poland and to analyse the correlations between producer opinions, especially of those who implemented the most popular commercial GLOBALG.A.P. standard, and to analyse profiles of farms and their owners.

### **Legal and market determinants of quality systems implementation**

In recent years, food law requirements have contributed to changes in the behaviour of business entities in the European Union market. Those changes also refer to fruit and vegetable producers, and to distributors & purchasers of their products. At the stage of primary production, the producers are obliged to fulfil a number of legal requirements relating to the common organization of fruit and vegetable market as well as certain food law regulations relating to, among other things, the traceability system and hygienic requirements as contained in Annex I to the Regulation (EC) No 852/2004 [14]. The hygiene-related regulations require companies (and farms) ensure that their raw materials and processed products are protected against contaminants in air, soil, waters, fertilizers, biocides, contaminants derived from plant protection products or from storage facilities, also, from treatment and disposal of waste and other plant health-related measures and processes, which can have an impact on human health. Mandatory requirements for traceability are provided in Art. 18, Regulation (EC) No. 178/2002 [13]. The law on the common organization of fruit and vegetable market obliges the producers to, also, comply with commercial quality standards. The implementation of QA methods and systems as well as the presentation of relevant evidences of their proper functioning is, increasingly, a prerequisite for selling fruits to distribution networks at home and within the European Union. Optionally, when implementing QA methods and systems, the fruit growers can start with the Good Agricultural Practice (GAP), Good Manufacturing Practice/Good Hygiene Practice systems

(GMP / GHP systems), and integrated production, next, they can perform a Hazard Analysis and Critical Control Point (HACCP) system, commercial standards (GLOBALG.A.P., International Food Standard (IFS), British Retail Consortium (BRC), Global Standard for Food). In the end, they can implement management systems according to ISO 22000 and other regulations [18]. It is confirmed that fruit producers in Poland, more often than others, implement commercial standards, especially the GLOBALG.A.P. standard [7]. There is an interest in this standard resulting, mainly, from growing demands and consumer awareness, also, from retail chains requirements; for the latter, the GLOBALG.A.P. certificate is a reliable measure of high standards in primary production. According to the data provided by Wiśniewska [18] and the organization to which the standard [15] belongs, more than 130 thousand world farms in Europe were certified according to the commercial GLOBALG.A.P. standard, mostly in Italy, Spain, and Greece.

### **Material and methods**

The research study comprises both the results of the survey carried out amidst fruit producers and the interviews with experts conducted in 2011. Prior to appropriate analyses, a pilot study was conducted; the objective thereof was to verify the accuracy and articulation of questions of the survey. The study covered 530 producers from all over the country; they were mostly members of a Society for Promotion of Dwarf Fruit Orchards. A method of survey delivery was applied. Of all the 450 sent questionnaires in total, 30 filled in questionnaires were returned. Owing to a low quantity of responses received, another 80 questionnaires were distributed amidst producers with a request to fill in them during seminars, conferences, and training courses. Finally, the authors received 110 filled in questionnaires. Every questionnaire consisted of three parts. The questionnaires comprised questions ref. to basic information on a farm, its owner, and an opinion of fruit producer containing his/her motives of and barriers to the implementation of QA assurance system in the farm, and the achieved results of the producers. The data collected from the first and second part of the survey were used as explanatory variables. To investigate relationships among the variables and to verify the null hypothesis on the lack of any relationship among the explained variables (according to the opinions of the producers surveyed) and the explanatory variables (the profile of farms and their owners), a chi-square independence test was applied. The null hypothesis was verified with a significance level of  $p = 0.05$ . The null hypotheses of independence of the variables were rejected in the case the calculated value of chi-square was higher than the limit value (with the adopted significance level of  $p = 0.05$ ). According to formal requirements referring to found (empirical) numbers of the chi-square test, when the response category is indicated by a small number of respondents,

then, the answers in this category are omitted in the analysis. The collected data were analyzed using a Statistica 10 software (StatSoft).

### **Profile of fruit farms surveyed**

The research study presents the growers opinions in total and, also, the opinions of those who implemented GLOBALG.A.P. standard in their farms. The latter farms covered 34.5 % of all the fruit farms surveyed. Of all the farms surveyed the farms with the GLOBALG.A.P. standard implemented were characterized by a higher average area of orchards and longer fruit-producing traditions. Often, their owners had a university degree; more often, they were members of groups of producers and, more likely, they benefited from the EU funding. Those farms exported their fruits slightly more often and, significantly less frequently, sold their fruits directly from the farms. The subjective assessment showed that the knowledge of those owners, as regards the pest management, QA systems, commercial quality standards, food law, and principles of raising funds from the EU assistance fundings was broader compared to others. The detailed profiles of the two groups of farms are shown in Table 1.

The respondents with the implemented GLOBALG.A.P. standard were engaged in the orchard production at least 21 years, on average. 79 % of those growers had, at least, a secondary education, and almost every other grower had a university degree (47 %). 84.2 % of those farms were members of a group or a organization of producers. Apart from the direct payments, 89.5 % of fruit growers with the implemented commercial GLOBALG.A.P. standard benefited, or currently benefit from the financial backing by the European Union. The farms surveyed were well-equipped with major means of production and had a proper infrastructure. More than 55 % of the producers exported their fruits; over 60 % supplied fruits to supermarket wholesalers, wholesale stores, or they sold fruits in a wholesale market. Approximately 29 % of the producers sold fruits to customers directly from their farms; nearly 24 % supplied fruits to shop retailers or sold fruits in markets and stalls. Other fruit sales channels were used by 37 % of the farms with the implemented GLOBALG.A.P. standard and included: selling to a processing company and selling through groups of producers or organizations they belonged to as their were members. The majority of respondents who implemented GLOBALG.A.P. (92 %) knew exact principles of integrated pest management, 60 % of the respondents declared to have a very good knowledge of fruit quality assurance systems, 51 % declared to have a very good knowledge of commercial quality standards, and the remaining respondents declared to have knowledge of how to apply and receive funds from EU fundings. It is quite probable that the producers have a really good knowledge of those issues thanks to their participation in respective trainings, conferences, and seminars.

Table 1. Profile of surveyed fruit producers in total (n = 110) and of those who implemented GLOBALG.A.P. standard (n = 38).

Tabela 1. Charakterystyka badanych producentów owoców ogółem (n = 110) i mających wdrożony standard GLOBALG.A.P. (n = 38).

Specification Wyszczególnienie	$\bar{x}$		SD / s	
	n = 110	n = 38	n = 110	n = 38
Area of orchards [hectares] / Powierzchnia sadów [ha]	19.4	22.5	35.3	33.3
Traditions in fruit production (years) / Tradycje w produkcji owoców (lata)	19.9	21.5	10.5	9.3
Producer's education [% of indication] / Wykształcenie producentów [% wskazań]:				
- primary / podstawowe	3.7	0.0	-	-
- vocational / zawodowe	17.6	21.0	-	-
- secondary / średnie	40.7	31.6	-	-
- higher / wyższe	38.0	47.4	-	-
Age of farm owner [% of responses] / Wiek właściciela gospodarstwa [% wskazań]:				
- 20 - 29 years old / lat	13.8	2.6	-	-
- 30 - 39 years old / lat	23.8	31.6	-	-
- 40 - 49 years old / lat	24.8	23.7	-	-
- 50 - 59 years old / lat	26.6	23.7	-	-
- 60 and more years old / 60 lat i więcej	11.0	18.4	-	-
Group of producers membership [% of responses] / Członkostwo w grupie producentów [% wskazań]	45.5	84.2	0.5	0.4
Use of EU funds [% of response] / Korzystanie z funduszy UE [% wskazań]	69.7	89.5	0.4	0.3
Fruit sales channels <sup>1</sup> : / Kierunki sprzedaży owoców <sup>1</sup> :				
- export / eksport	52.4	56.0	30.1	28.9
- wholesale / sprzedaż hurtowa	52.8	43.1	30.6	32.0
- retail / sprzedaż detaliczna	29.7	26.1	23.9	17.6
- directly from the farm / bezpośrednio z gospodarstwa	27.3	8.5	33.4	6.5
- others / inne	75.3	78.4	34.5	29.5
Subjective assessment of knowledge <sup>2</sup> of: / Obiektywna oceny znajomości <sup>2</sup> :				
- food law / prawa żywnościowego	3.2	3.4	1.1	1.1
- integrated plant protection / integrowanej ochrony roślin	4.1	4.4	0.9	0.8
- quality assurance (QA) systems / systemów zapewnienia jakości	4.1	4.5	0.9	0.7
- commercial quality standards / standardów jakości handlowej	4.5	4.9	0.7	0.3
- usage of EU assistance programs / korzystania z programów pomocowych UE	4.0	4.4	0.9	0.5
Location of the farm [% of responses] / Położenie gospodarstwa [% wskazań]:				
- lubelskie	50.9	62.2	-	-
- mazowieckie	6.5	13.5	-	-
- świętokrzyskie	20.4	8.1	-	-
- other voivodeships / inne województwa	22.2	16.2	-	-

Explanatory notes: / objaśnienia:

<sup>1</sup> percentage of fruits sold using given distribution channel / procent owoców sprzedawanych przez dany kanał zbytu;

<sup>2</sup> 1-5 assessment scale / ocena w skali 1-5: 1 – I definitely do not know / zdecydowanie nie znam, 2 – I do not know much / raczej nie znam, 3 – I heard about it / słyszałem o tym, 4 - I know but without details / znam lecz bez szczegółów, 5 – I know exactly / znam dokładnie.

## Interviews with Experts

Interviews with experts constituted an important part of the study. 24 semi-structured interviews in total were conducted. The experts questioned were scientists, auditors and quality assurance consultants, orchard advisors, government officials and representatives of grower organization community. Prior to the interview, every expert surveyed signed an agreement of participation in the study. The interviews were conducted on the basis of a pre-prepared script framework that orchestrated a conversation. Depending on the direction of conversation, a fixed order of questions was sometimes changed and additional clarifying questions were asked. Every interview began with a short briefing, in which the objective of the survey was presented and information about recording the conversation was announced. The recorded interviews were transcribed without correcting the style of the statements. The surveys analysis consisted, mainly, in the categorization, compilation, and analysis of relevant fragments of the text. When analyzing the interviews, no specific methods of analysis were applied, only a range of *ad hoc* techniques (known as bricolage) [8].

## Results and discussion

### *Motives of quality systems implementation*

The studies and analyzes prove that the organizational and economic conditions have a significant impact on the degree of implementation of methods and quality assurance systems in the fruit production. Most commonly, the producers indicated the following motives for implementing GLOBALG.A.P. standard: increased sale opportunities, entering products into new markets, and meeting customer requirements (Fig. 1). The opinions of growers as regards the motives of quality assurance systems implementation were significantly associated with the location of the farm in the country (voivodeship) and with how the respondent subjectively assessed the knowledge of the food law issues (Table 2).

It can be assumed that the requirements of domestic fruit consumers will constantly increase in the future and the implementation of quality assurance standards will be a necessary condition for selling fruits not only abroad but also locally. The least frequent motives of standard implementation as indicated by the producers were the improvement of work organization on the farm, the rational usage of production

means resulting in reduced production costs, and the improvement of production efficiency. While taking steps to implement quality standards, the producers with implemented GLOBALG.A.P. standard are guided, more frequently than other respondents, by the desire to face the competition in the sector, as well as to obtain a positive outcome of official control of fruit quality, and to improve the work organization on the farm (Fig. 1).

Table 2. Motives of quality assurance system implementation in farms with implemented GLOBALG.A.P. standard depending on profile of farms and their owners.

Tabela 2. Motywy wdrożenia systemu zapewnienia jakości w gospodarstwach, które miały wdrożony standard GLOBALG.A.P. w zależności od charakterystyk gospodarstw i ich właścicieli.

Profile of farms or their owners Charakterystyki gospodarstw lub ich właścicieli		Motives for implementing quality assurance systems in farms Motywy wdrażania systemów zapewnienia jakości w gospodarstwach							
		a	c	e	f	g	h	l	ł
Farm location (voivodship) Położenie gospodarstwa (województwo)	$\chi^2$ p	5.20 0.51	16.94* 0.01	10.92 0.09	7.16 0.30	6.59 0.36	4.24 0.64	6.94 0.32	10.37 0.11
Area of orchards Powierzchnia sadów	$\chi^2$ p	-	11.91 0.92	16.44 0.68	19.74 0.47	18.95 0.52	14.14 0.82	-	19.65 0.48
Membership in a group of producers Członkostwo w grupie producentów	$\chi^2$ p	0.93 0.33	0.45 0.50	0.00 0.95	3.03 0.08	0.58 0.44	0.04 0.83	1.09 0.29	3.77 0.05
Raising funds from UE assistance funding Korzystanie z funduszy pomocowych UE	$\chi^2$ p	0.00 0.95	0.31 0.57	0.63 0.42	0.88 0.34	0.05 0.82	0.88 0.34	0.01 0.90	0.89 0.34
Fruit sales channels: Kierunki sprzedaży owoców:									
- export /eksport	$\chi^2$ p	12.49 0.33	15.00 0.18	11.20 0.42	9.51 0.57	10.79 0.46	12.35 0.34	-	14.33 0.21
- wholesale / sprzedaż hurtowa	$\chi^2$ p	16.23 0.23	15.34 0.28	13.51 0.41	14.56 0.33	13.50 0.41	17.73 0.16	13.65 0.39	15.14 0.29
- retail sale / sprzedaż detaliczna	$\chi^2$ p	6.30 0.28	9.00 0.11	6.00 0.30	4.27 0.51	6.97 0.22	6.30 0.28	-	6.30 0.28
- directly from the farm / bezpośrednio z gospodarstwa	$\chi^2$ p	-	-	-	1.57 0.81	-	-	-	6.97 0.14
- other channels / inne kierunki zbytu	$\chi^2$ p	2.94 0.56	5.56 0.23	4.08 0.39	4.19 0.38	5.56 0.23	2.02 0.72	4.39 0.35	7.61 0.46
Fruit production traditions Tradycje w produkcji owoców	$\chi^2$ p	-	15.46 0.56	18.44 0.36	14.26 0.64	14.26 0.64	14.18 0.65	19.28 0.31	17.67 0.41
Age of farm owner Wiek właściciela	$\chi^2$ p	-	6.02 0.19	1.25 0.87	4.85 0.30	4.85 0.30	2.69 0.61	1.26 0.87	1.66 0.78
Education of farm owner Wykształcenie właściciela	$\chi^2$ p	-	0.18 0.91	2.04 0.36	3.63 0.19	0.36 0.83	0.16 0.92	2.14 0.34	0.97 0.61

c.d. Tab. 2.

Subjective assessment of knowledge of: Subiektywna ocena znajomości:									
- food law / prawa żywnościowego	$\chi^2$	-	6.03	3.23	6.94	5.23	5.23	<b>10.30*</b>	6.24
- standards of commercial quality / standardów jakości handlowej	p		0.19	0.52	0.14	0.26	0.26	0.03	0.18
- systems of quality assurance / systemów zapewnienia jakości	$\chi^2$		2.08	3.67	4.96	4.96	2.60	2.89	5.00
- integrated plant protection / integrowanej ochrony roślin	p	-	0.55	0.29	0.17	0.17	0.45	0.41	0.17
- raising funds from UE assistance / korzystania z funduszy pomocowych UE	$\chi^2$		1.52	0.49	3.17	0.29	0.29	2.82	4.94
	p	-	0.47	0.78	0.29	0.86	0.86	0.24	0.08
	$\chi^2$		0.03	1.56	1.38	1.38	1.38	0.49	0.25
	p	-	0.86	0.21	0.24	0.24	0.24	0.48	0.61
	$\chi^2$		1.85	0.55	0.78	2.17	0.45	2.31	1.61
	p	-	0.39	0.76	0.67	0.34	0.79	0.31	0.44

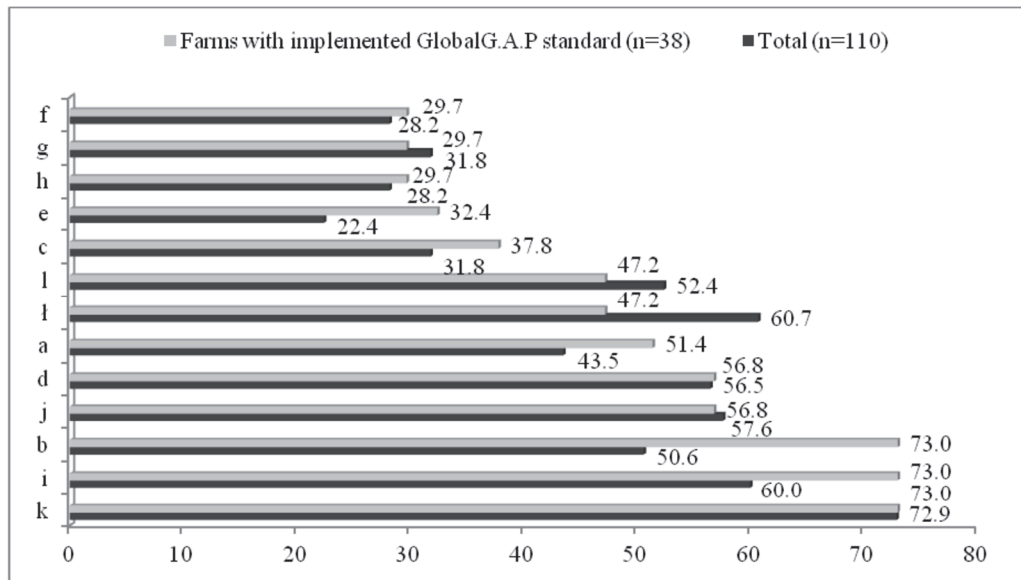
Explanatory notes: / objaśnienia:

- motives are denoted in the same way as in Fig. 1/ oznaczenia motywów jak na rys. 1.;

- in Table, some motives were omitted owing to a small number of respondents indicating a given motive and because of the formal requirements of the test  $\chi^2$  as regards the number of empirical data (the observed) / w tabeli pominięto niektóre motywy z uwagi na niewielką liczbę respondentów wskazujących dany motyw i formalne wymogi testu  $\chi^2$  wobec liczebności empirycznych (obserwowanych);\* - hypothesis of independence of the variables should be rejected at a significance level of  $p = 0.05$  / hipotezę o niezależności zmiennych należy odrzucić na poziomie istotności  $p = 0,05$ .

The above findings imply that in the investigated farms, market conditions are more important than those referring to the work organization and management efficiency improvement. Probably it results from a high marketability of production in the farms surveyed. On the other hand, it is contradictory with a rather low profitability of fruit production as assessed in every third surveyed farm; however, the low profitability should encourage the producers to seek other ways to decrease production costs of fruits. Mayes and Mortimore [9] also point out such motives for implementing quality management systems and food safety as, usually, consumer pressure, legal requirements, and desire for self-improvement. Kijowski [5] indicates the following to be consequences of activities taken to assure quality: increase in safety and food quality in domestic and international trade, improvement of production hygiene and compliance with the EU legal requirements, reduced risk of food poisoning, reducing the number of complaints and, also, creation of an important marketing factor for business. In the reference literature, the impact is highlighted of QA system implementation on the increase in awareness and involvement of employees, and it is stressed that the implemented QA system helps manage farms [12].





Explanatory notes: / Objaśnienia:

a – Increasing level of trust /credibility among customers / Podniesienie zaufania/wiarygodności u klientów/odbiorców; b – Meeting customer demands / Sprostanie wymaganiom klientów/odbiorców; c – Facing competition in the sector / Sprostanie konkurencji w sektorze; d – Improving fruit quality / Poprawa jakości owoców; e – Positive results of official inspection / Pozytywne wyniki kontroli urzędowej; f – Better work organization on the farm / Poprawa organizacji pracy w gospodarstwie; g – Improving production efficiency / Poprawa efektywności produkcji; h – Efficient use of production factors (and, as a result, reduction in production costs) / Racjonalizacja zużycia czynników produkcji (i w efekcie zmniejszenie kosztów produkcji); i – Introducing products to new markets / Wejście z produktami na nowe rynki zbytu; j – Increasing bargaining power of farm when negotiating with customers / Zwiększenie siły negocjacyjnej gospodarstwa w kontaktach z odbiorcami; k – More possibilities to market products / Większe możliwości zbytu; ł – Possibility to obtain higher prices for certified fruits / Możliwość uzyskania wyższych cen za owoce z certyfikatem; 1 – Maintaining current customers / Utrzymanie dotychczasowych odbiorców.

Fig. 1. Motives of QA standards and systems implementation in orchard farms [% of responses].

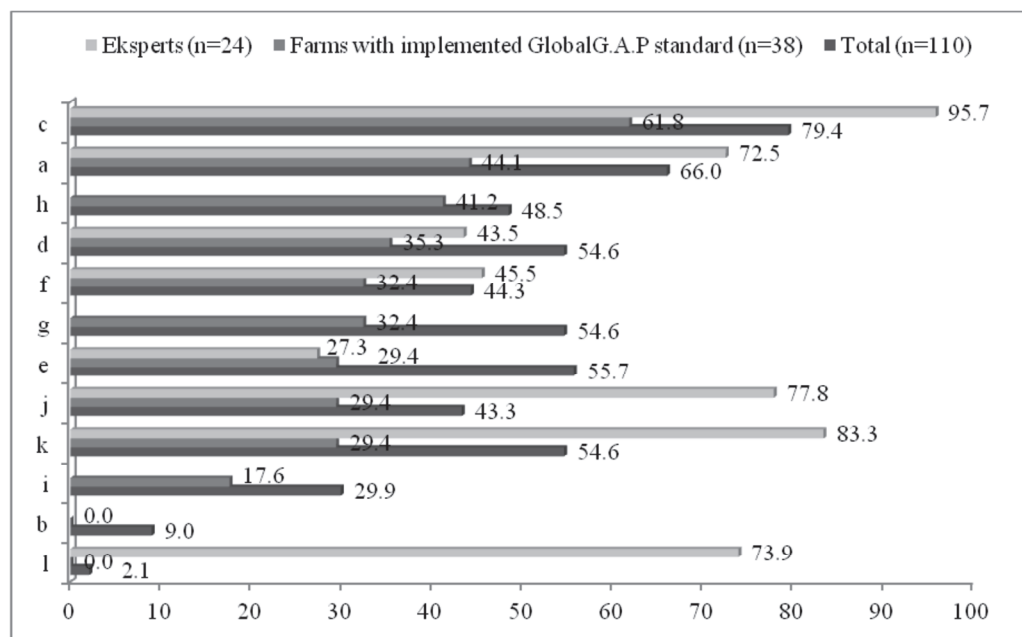
Rys. 1. Motywy wdrażania standardów i systemów zapewnienia jakości w gospodarstwach sadowniczych [% wskazań].

What is more, many other benefits are pointed out in the reference literature. Some of them are as follows: business is run in accordance with applicable laws and regulations; the level of food safety assurance and its quality is increased; satisfaction and expectations of external customers are improved; communication with customers is improved; documents are better arranged; it is possible for producers to introduce their products in certain retail chains that require the use of non-compulsory quality

management system; the competitiveness of enterprises and their management is improved, etc. [11].

### Barriers to the quality systems implementation in fruit farms

According to the producers surveyed, the barriers to implementation of quality assurance systems are: the lack of economic motivation since there is no price difference between the certified and non-certified products (Fig. 2). The above barrier is more



Explanatory notes: / Objaśnienia:

a – Lack of knowledge about QA assurance systems and methods / Brak wiedzy o metodach i systemach zapewnienia jakości; b – I do not understand the idea of those systems / Nie rozumiem idei tych systemów; c – I am not economically motivated / Nie mam motywacji ekonomicznej; d – Lack of financial means to implement the system / Brak środków finansowych na wdrożenie systemu; e – It is not necessary / Nie ma takiej potrzeby; f – Difficulties in preparing the required documentation / Trudności z opracowaniem wymaganej dokumentacji; g – High costs / Duże koszty; h – Lack of time / Brak czasu; i – Reluctant employees / Niechęć zatrudnionych; j – Fears of the new and unknown system / Obawy przed nowym i nieznanym systemem; k – Fears of the farm's future / Obawy o przyszłość gospodarstwa; l – Other barriers / Inne bariery.

Fig. 2. Barriers to implementing QA systems and fruit safety assurance systems in farms [% of responses].

Rys. 2. Bariery wdrażania systemów zapewnienia jakości i bezpieczeństwa owoców w gospodarstwach [% wskazań].

often indicated by the experts (95.7 % of the responses of experts and 79.4 % of the responses of fruit producers). However, it was pointed out that the profitability of production provided not only a higher price, but also a drop in the production expenditures as a result of rationalization of its consumption. Moreover, the farms with quality assurance certificates for their products have calculable economic benefits because they face more possibilities of selling fruits, both at home and abroad.

Dąbrowski [3] emphasizes the need for changing the perception of potential economic benefits resulting from the implementation of quality system among producers, so that they would make decisions about the system implementation on the basis of a comprehensive analysis of the requirements of the law, the market, and consumers. Some experts pointed out a significant increase in the costs during the implementation phase and its maintenance, and little support in this sphere from the national and EU financial resources. Other experts pointed out that the increase in costs was associated not so much with the system implementation as with adjusting farms to the legal requirements and with the application of good agricultural practice. When calculating costs connected with the implementation of the EurepGAP commercial standard (a previous version of the GLOBALG.A.P. standard) in the citrus production in Spain, Moll and Igual [10] concluded that the total costs were higher by approximately 34 % in the traditional production system compared to farms with the EurepGAP standard, at about 0.02 euros per kilogram. Some experts claim that the lack or insufficient support from the national or EU funds is a barrier to the implementation in small and medium-sized farms, but not in the large ones. Based on the research conducted in the family farms in Chile, Villalobos et al. [17] found that the economic and technical requirements relating to the implementation and official certification of the PABCO standard were not the major barriers, because the costs associated with adapting to the requirements have been met by higher product prices. Another important barrier mentioned by the producers is a lack of knowledge about the methods and systems of quality assurance among a large number of fruit growers and a shortage of time resulting from a significant time-consuming production (Fig. 2). Likewise, 73 % of the experts also pointed out a lack of knowledge about the methods and systems among the t growers. Notwithstanding those opinions, 60 % of the respondents to implement the GLOBALG.A.P. standard said they knew the exact requirements of the system to ensure the quality of the fruit; 27 % were familiar with them without detailed information. The research conducted by Dąbrowski and Majewski [2] show significant differences in the knowledge and awareness of different groups of producers from various regions of Poland and potential barriers to the implementation of good practice in crop protection and integrated production in the fruit farms. Dąbrowski [3] suggests that knowledge of quality systems should be treated as an equal part of new technologies, tools, experiences, and information. The significantly fewer producers pointed to fears

of the future of the farm, of the new and unknown system, or overburdening the employees with additional notes. The experts rarely indicated high requirements on the keeping of documentation and a lack of financial resources for the implementation or an unstable situation in the domestic market. The lowest percent of the experts (27.3 %) and producers (29.4 %) assumed there was no need for implementing QA

Table 3. Barriers to implementing QA systems in farms who implemented the GLOBALG.A.P. standard depending on the profile of farms and their owners.

Tabela 3. Bariery wdrożenia systemów zapewnienia jakości w gospodarstwach, które miały wdrożony standard GLOBALG.A.P. w zależności od charakterystyki gospodarstw i ich właścicieli.

Profile of farm or farm owners Charakterystyki gospodarstw lub ich właścicieli		Barriers to implementing QA systems in farms Bariery wdrażania systemów zapewnienia jakości w gospodarstwach									
		a	c	d	e	f	g	H	i	j	k
Farm location (voivodeship) Położenie gospodarstwa (województwo)	$\chi^2$	9.12	-	6.75	11.80	8.46	6.28	4.44	15.71*	9.43	6.39
	p	0.01	-	0.34	0.06	0.20	0.39	0.61	0.01	0.15	0.38
Area of orchards Powierzchnia sadów [ha]	$\chi^2$	18.93	-	16.70	18.27	20.64	20.79	-	14.18	20.79	20.64
	p	0.52	-	0.67	0.57	0.42	0.41	-	0.82	0.41	0.41
Membership in a group of producers Członkostwo w grupie producentów	$\chi^2$	4.54*	0.07	3.14	0.05	3.92*	1.04	1.36	5.25*	4.87*	0.05
	p	0.33	0.78	0.07	0.81	0.04	0.30	0.24	0.02	0.02	0.81
Raising funds from UE assistance fundings Korzystanie z funduszy pomocowych UE	$\chi^2$	0.06	0.34	8.31*	0.03	0.65	0.65	0.15	0.97	0.93	0.93
	p	0.80	0.56	0.04	0.33	0.42	0.42	0.70	0.32	0.33	0.33
Fruit sales channels: Kierunki zbytu owoców: - export / eksport	$\chi^2$	8.63		8.20	10.45	12.91	13.52	9.89	7.46	9.69	12.16
	p	0.65		0.69	0.49	0.29	0.26	0.70	0.76	0.56	0.35
- wholesale / sprzedaż hurtowa	$\chi^2$	8.00		7.87	8.89	17.07	12.89		12.89	12.36	10.22
	p	0.84		0.85	0.78	0.19	0.45		0.45	0.49	0.67
- retail sales / sprzedaż detaliczna	$\chi^2$	6.00			4.27	4.27	6.30	6.87	9.00	4.27	
	p	0.30			0.51	0.51	0.27	0.14	0.11	0.51	
- directly from the farm / bezpośrednio z gospodarstwa	$\chi^2$	1.33		2.33	2.59	2.06	2.70	5.33	1.65	3.25	2.59
	p	0.85		0.67	0.62	0.72	0.61	0.25	0.79	0.51	0.63
- other channels / inne kierunki zbytu	$\chi^2$	3.00		5.25	3.00	5.82	3.00		5.33	5.33	3.00
	p	0.55		0.26	0.55	0.21	0.55		0.25	0.25	0.55
Traditions in fruit production Tradycje w produkcji owoców	$\chi^2$	12.09		15.39	25.81	16.18	17.09	19.74	15.42	14.73	19.79
	p	0.79		0.56	0.08	0.51	0.45	0.31	0.53	0.61	0.28
Age of farm owner Wiek właściciela	$\chi^2$	2.04		2.21	0.78	0.83	0.49	1.40	0.07	1.74	1.74
	p	0.35		0.33	0.67	0.66	0.78	0.49	0.96	0.42	0.42
Education of farm owner Wykształcenie właściciela	$\chi^2$	5.56		3.11	3.38	3.24	9.79*	3.33	9.63*	4.58	2.63
	p	0.23		0.4	0.49	0.52	0.04	0.50	0.04	0.3	0.62

c.d. Tab. 3.

Subjective assessment of knowledge of:										
Subiektywna ocena znajomości:										
- food law / prawa żywnościowego	$\chi^2$	6.60	5.86	6.79	9.75*	2.02	3.66	10.34*	6.62	8.02
	p	0.15	0.21	0.14	0.04	0.73	0.45	0.03	0.15	0.09
- standards of commercial quality / standardów jakości handlowej	$\chi^2$	1.81	1.69	1.07	1.09	0.42	3.29	0.44	1.54	1.37
	p	0.61	0.64	0.78	0.78	0.93	0.34	0.93	0.67	0.71
- QA systems / systemów zapewnienia jakości	$\chi^2$	1.94	2.28	2.37	0.48	0.37	1.58	0.39	0.23	0.61
	p	0.38	0.32	0.30	0.78	0.83	0.45	0.82	0.89	0.74
- integrated plant protection / integrowanej ochrony roślin	$\chi^2$	0.15	0.00	0.02	0.00	1.77	0.08	0.55	0.02	2.19
	p	0.69	0.94	0.87	0.97	0.18	0.77	0.45	0.87	0.14
- raising funds from UE assistance fundings; korzystania z funduszy pomocowych UE	$\chi^2$	1.61	4.78	2.42	0.74	2.55	0.74	3.87	0.85	0.85
	p	0.44	0.09	0.29	0.69	0.28	0.69	0.14	0.65	0.65

Explanatory notes: / objaśnienia:

- barriers are denoted in the same way as in Fig. 2. / Oznaczenia barier jak na rys. 2.

\* - hypothesis about the independence of variables should be rejected at a significance level of  $p = 0.05$  / hipotezę o niezależności zmiennych należy odrzucić przy poziomie istotności  $p = 0,05$

system in the farms. Such opinions seem surprising if considering the consumer market conditions and strong competition therein. For 41 % of those experts, the domestic customers of fruits do not require the implementation of QA systems; over 27 % believed that the fruits produced in the country were of high quality and the production standards in many farms were very high. It seems the presented opinions could result from inadequate knowledge of the requirements of food law in the European Union and, also, of the role of systems to ensure traceability and responsibility for products traded in the market. Compared to the others, the producers with the implemented commercial GLOBALGAP standard less often indicated the following barriers: lack of need to implement the quality system in the farm; fears of the future of the farm; high costs, especially costs of adaptation to the requirements of the quality standard; lack of knowledge about QA methods and systems, including a lack of professional employment; lack of financial resources, especially of their own resources.

The producers with the implemented commercial GLOBALG.A.P. standard indicated, more often than the others, a lack of specialists and consultants in this field and fears of a new and unknown system as the barrier to implement a quality system. They claimed more often that the technology of production would assure the quality of fruits (Fig. 2). The opinions of the producers as regards barriers to the implementation of QA assurance systems were significantly correlated with the location of farm in the country (voivodeship), the membership in the group of producers, the education of farm owners, and the subjective assessment of knowledge of food law (Table 3).

## Conclusion

Currently, without an appropriate quality certification system or commercial standards, fruits cannot be sold in the international market. In the Polish orchards, the integrated production and the commercial GLOBALG.A.P. standard are most popular. The use of those voluntary standards results from the legal conditions relating to food law requirements on traceability and responsibility for unsafe products, from the plant protection law, the use of pesticides, etc. Market conditions are also very important, especially such as the increasing possibility of selling products, maintaining the existing customers, and entering new sales markets. According to the survey results, the producers consider the organizational and economic factors to be less important. For the producers who implemented the GLOBALG.A.P. standard, the significance of those factors is correlated, to a considerable degree, with the location of the farm in the country (voivodeship) as well as with the producer's knowledge of wider issues relating to the quality of fruits assurance including the knowledge of food law. The most important barrier to the implementation of fruit quality and safety standards is the lack of economic incentives resulting from a lack of diversification of the market price for certified and non-certified fruits. Lack of motivation is compounded by the fears of the future of farm resulting, mainly, from the instability in the market. It is possible to assure a broader implementation of quality systems through increasing the knowledge of both the producers and the consumers about legal requirements on food sales, about QA systems, and the benefits for the producers and the consumers resulting from the implementations of those systems. The awareness is maintained by the lack of requirements regarding the implementation of the quality systems for some domestic customers. Thus, a stronger market pressure, especially the domestic market pressure, as well as the effective training of fruit producers could help overcome those barriers to the implementation of QA methods and systems in the fruit farms in Poland, in particular of the most popular commercial GLOBALG.A.P. standard.

Further research should focus on how the producers are to undertake economic initiatives encompassing decisions on the implementation of new methods and concepts of farm management as well as on increasing the effectiveness of trainings of the producers on the implementation of QA methods and systems in the farm. Those issues are particularly important for the development of orchard consultancy, which can stimulate the activeness of producers towards pro-quality activities through informative, educational and consultative actions. The importance of this issue grows in the face of changes in the perception of the producers' position in the market, from manufacturer to active entrepreneur, whose aim is to support the family by providing the income and conditions for running a long-term business and improving management efficiency.

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## UWARUNKOWANIA WDRAŻANIA SYSTEMÓW ZAPEWNIENIA JAKOŚCI OWOCÓW W POLSCE

### Streszczenie

Standard handlowy GLOBALG.A.P. i integrowana produkcja są najbardziej powszechnymi metodami zapewnienia jakości i bezpieczeństwa owoców. Ich wdrożenie w gospodarstwach sadowniczych jest konsekwencją wymagań prawa żywnościowego i konsumentów, którzy chcą spożywać produkty wysokiej jakości i przede wszystkim bezpieczne dla zdrowia. Wdrożenie tych metod zapewnienia jakości warunkuje sprzedaż produktów do dużych międzynarodowych sieci handlowych w kraju i na eksport. Motywy i bariery ich stosowania określono na podstawie badań ankietowych wśród producentów owoców, w tym tych, którzy mieli wdrożony standard GLOBALG.A.P. i wywiadów z ekspertami. Stwierdzono, że głównymi motywami wdrożenia systemów zapewnienia jakości w gospodarstwach sadowniczych w Polsce są: zwiększenie możliwości sprzedaży, wprowadzenie produktów na nowe rynki zbytu i sprostanie wymaganiom klientów. Natomiast do głównych barier można zaliczyć brak motywacji ekonomicznej i brak wiedzy o metodach i systemach zapewnienia jakości.

**Słowa kluczowe:** gospodarstwa sadownicze, systemy jakości, wdrożenie, GLOBALG.A.P. ☒