

## PRODUCTION POTENTIAL AND STORAGE SPACE IN FARMS ORGANIZED IN THE FRUIT PRODUCERS' GROUP\*

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**Summary.** The paper presents analysis of production potential of farms organized in the fruit producers' group. Moreover, the analysis of the storage space was assumed as the purpose of the paper. The scope of work covered a group uniting 6 farms of average area of 8 ha of AL intended in 100% for planting fruit trees (apple trees in 90% and pear trees in 10%). A producers' group have the storage space in total of 2183 m<sup>3</sup>. A unit index of the storage area use was at the average 0.71 t·m<sup>-2</sup>. The plan of cooperative developing, which is carried out by the group includes technical investments, which directly will influence production quality improvement.

**Key words:** potential, storage, producers' group, production, fruit

### Introduction

Currently, formation of producers' groups, which organize individual farm producers is an alternative which influences the increase of the production potential of farms. The producer group is an agreement between people who operate together in order to increase incomes and to decrease production costs and who are convinced that common marketing is the best way to increase a market position of farms [Jablonka, Kałuża, Marcysiak, Nawrocki, Szarek 2006; Szelaq-Sikora, Cupiał 2012]. Producers' groups act on the basis of provisions of two acts: Act of 15 September 2000 on the farm producers' groups and their relations and on the amendments of other acts (Journal of Laws, no.88, item 983 as amended) and the Act of 29 November 2000 on organisation of the fruit and vegetables market (Journal of Laws, No.3, item 19 of 2001) [Farm producers' groups (on-line)]. Small and individual farms have more difficulties in remaining on the European market since incomes from the agricultural activity cannot cover the costs of purchase of modern equipment or modernisation of an old technical base. At the same time it is more difficult for

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individual farms to strengthen their position on the European market, since frequently they are not able to supply large uniform parts of products on time, which results from the lack of suitable machines and technologies. Except for large parts and continuity of supplies, these products should be of high quality in order to meet the recipients' demands [Szelaġ-Sikora, Kowalski 2008]. Necessity of maintaining stocks is mainly connected with ensuring continuity of production processes, continuity of sale, protection against changes of prices as well as maintaining technical readiness of the owned machines and devices [Kuboń 2006; Kowalski, Tabor 2003]. Maintaining stocks at a particular quantitative and qualitative level forces farmers to possess suitable storage infrastructure in the form of facilities and storage facilities (barns, carports, siloses, cool storages, containers and dunging gutters). Number and type of storages should result from the production profile and transport organisation (supply and market) and all actions related to stocks management should be directed to minimization of direct and indirect storing expenses [Kuboń 2008]. In many farms, existing storing potential considerably exceeds present demands concerning storing of commodities. Low use of the storage space causes increase of production costs and at the same time cost-effectiveness of managing [Kuboń 2008]. Meeting the challenges of the European Union markets is possible through modernization of agricultural farms and uniting farmers [Jabłonka, Kałuża, Marcysiak, Nawrocki, Szarek 2006].

The objective of the paper was to analyse production potential of the fruit producers' group and storage infrastructure, which they possess. The scope of work covered a producers' group which unites 6 individual farms. In order to fully carry out the objective of the work, analysis of the land resources and the size of the obtained crop was carried out. Economic effect of production was presented by means of calculation of standard gross margin. In case of the analysis of the storage infrastructure a list and a description of the storage area, which were in the possession of particular farms organized in the group, were prepared. A production year 2012 was included in the research.

A producers' group included in the research was located in Małopolskie voivodeship which was formed in 2009 and owns a legal form of cooperative. A superior aim recorded in the group statute is an improvement of management effectiveness and the quality of fruit production which is intended to translate into sale of the obtained product on the market. Apples and small amount of pears is the subject of the group's production.

## **Research methodology**

Research was carried out in the form of guided survey in farms organized in the fruit producers' group. Collected source data allowed calculation of inter alia the index of standard gross margin. According to Augustyńska-Grzybek [2000] it is the annual value of production obtained from one hectare of crops or from one animal, from which direct costs of production were deducted. Value of production is a sum of main and side products value, which are on the market, and is determined according to sale prices. Subsidies are added to the production value. The list of direct costs, which come from the outside of a farm, are described as purchase prices, while costs generated in a farm according to sale prices.

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Standard gross margin was calculated according to the following formula:

$$NB = PK_{\text{gross}} - KB_{\text{m-s}} + SU \text{ [thousand PLN} \cdot \text{ha}^{-1} \text{ AL]} \quad (1)$$

where:

- PK<sub>gross</sub> – the annual value of the gross final production obtained from animal and plant production,
- KB<sub>m-s</sub> – direct costs of production,
- SU – union subsidies i.e. direct subsidies.

## Results of the research

### Farms production

Average area of crops per one farm was 9.67 ha and it was an area completely allotted for planting fruit trees i.e. apple trees (90%) and pears (10%). Within farms organized in a group, a significant diversity concerning land resources did not occur. In case of four farms, this area was at least 10 ha and in case of two remaining it was not lower than 7 ha. One can notice, while analysing the index of land resources in reference to a group as a whole, that the group possesses 58 hectares in total. At the same time, it is the area which can ensure the crop size, which enables smooth supply of goods to recipients through a long period of time (table 1).

Table 1. Production potential of the researched farms  
Tabela 1. Potencjał produkcyjny badanych gospodarstw

Specification	Farm						At the average in a farm	Total in the producers' group
	1	2	3	4	5	6		
The area of crops [ha]								
Apples	7.20	10.35	9.45	9.00	9.90	6.30	8.70	52.20
Pears	0.80	1.15	1.05	1.00	1.10	0.70	0.97	5.80
Total	8.00	11.50	10.50	10.00	11.00	7.00	9.67	58.00
The size of crops [t]								
Apples	180	270	270	225	270	180	232.50	1,395.00
Pears	20	30	30	25	30	20	25.83	155.00
Total	200	300	300	250	300	200	258.33	1550.00
Unitary crop [t·ha <sup>-1</sup> ]								
Total	25.00	26.09	28.57	25.00	27.27	28.57	26.72	-
Standard gross margin [thousand PLN]								
Total value	288.86	447.46	441.80	365.17	436.46	279.70	376.58	2259.45
Standard gross margin [thousand PLN·ha <sup>-1</sup> ]								
Unitary value	36.11	38.91	42.08	36.52	39.68	39.96	38.87	-
Standard gross margin [thousand PLN·ha <sup>-1</sup> ]								
Unitary value	1.44	1.49	1.47	1.46	1.45	1.40	1.45	-

Source: author's own study

According to detailed information collected during guided survey, farms belonging to a producers' group possess 10 apple cultivars and 2 pear cultivars in their orchards. Total production potential of all farms is 1550 t of fruit, and apples constitute a considerable majority – 90% of the total fruit production – analogically to the crop area. One farm produced at the average 232.50 t apples and 25.83 t of pears (table 1).

Fruit produced by members have a certificate of the Integrated Fruit Production. According to guidelines of the integrated Production, farms organized in a group are obliged to use the same technologies of production, including at the same time, very similar environmental and geographic conditions, average crops obtained from 1 ha are on a very similar level and are within 25.00–28.57 t·ha<sup>-1</sup> (table 1). Production effect index, expressed with the standard gross margin value with reference to the size of the obtained crop, was at the average in the researched farm on the average level of 1.45 thousand PLN·t<sup>-1</sup> – slightly varied between the researched objects. Since it was within 1.40–1.49 thousand PLN·t<sup>-1</sup>.

### **Description of the storage space in the researched farms**

A total area of storages and garages was assumed as the storage space for the analysis of the storage infrastructure. It is due to the fact that during collection of source data, farmers declared that they also store their crops in garages. It concerned the batch of fruit, which were intended to hit the markets as first and they did not require storing in the lowered temperature. Cool storages and fruit stores were jointly called storages in the paper.

The producers' group possessed the total storage space of 2183 m<sup>2</sup>. Storages took 1984 m<sup>2</sup>, which constituted 90.9% while the remaining storage space (garages) covered 199 m<sup>2</sup>, i.e. 9.1%. A storage of the lowest area (i.e. 240 m<sup>2</sup>) was reported in farm 2 while almost two times higher (i.e. 400 m<sup>2</sup>) in farm 3. In case of garages, their area in particular farms was within the range 18–45 m<sup>2</sup> (table 2).

A calculated index of the replacement value of the analysed storage space presents the size of capital invested in such types of fixed means. Total value of the discussed index for the whole producers' group was 3869.70 thousand PLN. At the average PLN 592.2 thousand, i.e. 87.4% were invested in storages, and the remaining 12.6% – 49.75 thousand PLN – was for the garages. When analysing the storage space in relation to the age of the researched farms, in may be found that average age of garages is 16 years and storages 24 years. The first farm singles out against the background of the whole group, where the analysed facilities are 4 years of age. Also, in a farm no.6, the age of the analysed storage space is in total at the average of as little as 8 years.

Reference to 1 ha of AL is an index which allows comparison of the researched facilities in regard to the storage space. Referring the storage space in the researched farms to the possessed land resources, information was obtained on the size of the storage space per 1 ha of the production area, which is planted with fruit trees (table 3). On the basis of indexes included in table 3, it was found that at the average 37.64 m<sup>2</sup> of storage space is per 1 ha of orchards in the researched farms. This index was for all farms within the range of 23.65–49.71 m<sup>2</sup> per 1 ha.

When analysing the replacement value of the storage space per 1 ha of orchards, one may notice that only in farm no.2 – which possessed the biggest area (i.e. 11.5 ha) – the value of this index was the lowest and did not exceed PLN 50 thousand per 1 ha. Simultaneously, in this facility, the index of using the storage space, accepted as the size of the crop in a production year, per 1 m<sup>2</sup> of storages was the highest and reached 1.10 [t·m<sup>-2</sup>]. In the remaining facilities, the value of the subject index was within the range of 0.57–0.77 t·m<sup>-2</sup>.

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Table 2. Description of the storage space

Tabela 2. Charakterystyka powierzchni magazynowej

Specification	Farm						Average in the farm	Total in the producers' group
	1	2	3	4	5	6		
Garages	18	32	32	45	32	40	33	199
Storages	280	240	400	396	360	308	331	1984
Total	298	272	432	441	392	348	364	2183
Replacement value [thousand PLN]								
Garages	27	48	48	67.5	48	60	49.75	298.5
Storages	504	432	720	712.8	648	554.4	595.2	3571.2
Total	531	480	768	780.3	696	614.4	644.95	3869.7
Age [in years]								
Garages	4	22	25	26	14	7	16	-
Storages	4	31	26	41	31	11	24	-

Source: author's own study

Table 3. Potential of the storage space

Tabela 3. Potencjał powierzchni magazynowej

Specification	Farm						At the average in a farm
	1	2	3	4	5	6	
Storage space and arable land area (production - orchards)							
[m <sup>2</sup> ·ha <sup>-1</sup> ]	37.25	23.65	41.14	44.10	35.64	49.71	37.64
Unitary index of the replacement value							
[thousand PLN·ha <sup>-1</sup> ]	66.38	41.74	73.14	78.03	63.27	87.77	66.70
Unitary index of using the storage space							
[t·m <sup>-2</sup> ]	0.67	1.10	0.69	0.57	0.77	0.57	0.71

Source: author's own study

Presently, the group of producers does not have a full possibility of storing, sorting and packing fruit according to the market expectations. A product is stored in storages and "regular" i.e without controlled atmosphere cold storages and fruit are sorted manually in farms by their members. Such a situation results in non-homogeneous products of low quality, which the group offers. Upon finalization of the 5-year acceptance plan (2010-2014) this situation will be changed due to realisation of the planned technical investments. Construction of an outbuilding – a storage of agricultural products, "fruit" with a socio-technical base and a purchase of a sorting machine and the remaining facilities will allow preparation of fruit for trade in a way expected by recipients. Fruit collected from all members stored in ULO conditions (cold storage with a controlled atmosphere – storing in low-oxygen conditions) and then prepared with large homogeneous parts concerning quality, size and colour, will allow a group to present a better offer. While the above will result in the increase of unit incomes of the producers' group members. A cold storage constructed by a group will have a total volume of approx. 1300 tons.

## Summary

Production potential of farms organized in the producers' group included in the research, expressed with the possessed land resources, was 9.67 ha per one farm at the average. Average yield obtained from this area was 258.33 t. In the unitary aspect economic production effect, i.e. value of the standard gross margin was at the average 1.45 thousand PLN·t<sup>-1</sup>.

In a joint aspect, the producers' group produces annually at the average 1550.00 t; it is a production level which enables entering not only a local but also a national market. A producers' group has the storage space in total of 2183 m<sup>2</sup>. At the present level of unitary production, the index of using the storage space for the whole group was 0.71 t·m<sup>-2</sup>. In the group members' opinion this space is insufficient therefore they plan to enlarge their storage infrastructure.

In order to compete on the fruit market, not only a proper size of particular batches of commodities must be ensured but also its quality must be considered. Therefore, in the group in a five-year development cooperative plan (2010-2014) technical investments were planned, which will directly influence the improvement of the quality of the produced fruit.

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## **POTENCJAŁ PRODUKCYJNY A POWIERZCHNIA MAGAZYNOWA W GOSPODARSTWACH ZRZESZONYCH W GRUPIE PRODUCENCKIEJ, UKIERUNKOWANEJ NA PRODUKCJĘ OWOCÓW**

**Streszczenie.** W pracy dokonano analizy potencjału produkcyjnego gospodarstw zrzeszonych w grupie producenckiej, ukierunkowanej na produkcję sadowniczą. Z cel pracy przyjęto również analizę posiadanej powierzchni magazynowej. Zakresem pracy objęto grupę zrzeszającą 6 gospodarstw rolnych o średniej powierzchni 8 ha UR przeznaczonych w 100% pod nasadzenia drzew owocowych (w 90% jabłoni i 10% gruszy). Grupa producencka dysponowała łącznie powierzchnią magazynową wielkości 2183 m<sup>3</sup>. Jednostkowy wskaźnik wykorzystania powierzchni magazynowej średnio w gospodarstwie wynosił 0,71 t·m<sup>-2</sup>. Realizowany przez grupę plan dochodzenia do uznania uwzględnia inwestycje techniczne, które bezpośrednio przyczynią się do poprawy jakości produkcji.

**Słowa kluczowe:** potencjał, magazyn, grupa producencka, produkcja, owoce

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