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Department of Economics and Organization of Enterprises, Warsaw University of Life Sciences,
Nowoursynowska 166, 02-787 Warszawa
e-mail: tomasz_rokicki@sggw.pl

BOGDAN KLEPACKI, TOMASZ ROKICKI

Factors determining sheep breeding profitability

Czynniki wpływające na opłacalność chowu i hodowli owiec

Summary. In the paper, factors determining sheep breeding profitability are presented. The research data used in the article were taken from Central Statistical Office, Institute of Organization and Management in Industry and farms in Podlasie region. Little population of sheep and production of lamb meat negatively influence profitability. The main factors are lamb price and payment of a subsidy for sheep breeding from EU and country budget. A big influence is exerted by cost of fodder. The expenditures include costs of own fodders which result from the outlays on fodder, plant protection means, fuel and energy. A big influence is exerted by growth consumption of lamb meat in Poland.

Key words: sheep, breeding profitability, agro-environment programs

INTRODUCTION

Lowering demand for sheep-farming products in the second half of 80th and in the first half of 90th of XX century made the reason for drastic sheep livestock population drop. Such changes resulted in lowering sheep-farming production profitability. Wool prices fell down mainly and overproduction of this product occurred worldwide [Klepacki 2005]. Polish wool had no chance to compete with cheaper and of better quality raw material from countries of much more advantageous conditions of its production [Niżnikowski 1994]. Inflation, rising costs of production means as well as no financial liquidity caused liquidation of many sheep herds [Poradnik… 2005]. It was necessary to change sheep usage to meet course. Such situation made the reason for changes of sheep amount and breed structure. Besides breeding for meat production, farming of preserving breeds became important course [Klepacki and Rokicki 2005]. Poland's entry to European Union changed farming conditions. Sheep-farming production support from Biological Progress Fund was liquidated. Instead, farmers could take advantage of direct payments or of agricultural and environmental payments. Incomes and costs as generated

in sheep-farming production were subject to change. Therefore, determination of factors that influence sheep-farming production profitability in Poland at the beginning of XXI century seems to be important [Rokicki 2007].

MATERIAL AND METHODS

Materials of various origin sources were used in the study. Empirical data for investigations were collected from engaged in sheep-breeding farms in Podlaskie Administration Province. They made grounds for calculation of direct surplus. Mass statistics data were also used to show tendency in agriculture and factors of indirect impact on sheep-farming production profitability. Materials are presented with tabular and descriptive method as well as with application of graphic & diagrams method.

RESULTS AND DISCUSSION

In respect of environmental conditions it is the cheapest to keep sheep in mountain region. This activity is conducted within the whole country's area. Permanent green arable land of V and VI class are used for this purpose in Podlasie [Rokicki 2008]. Sheep take excellently advantage of by-pass products from e.g. sugar-beet production in Wielkopolska, where field farming is dominating. Many production systems and technologies exist. Thus, environment factors are not limiting for sheep-farming production development. It is possible to distinguish the following factors that influence profitability and indirectly sheep-farming production development in Poland [Rokicki 2004, Klepacki 2005]: sheep livestock population, donation from national budget or other supporting forms, prices to be got for lambs, number of lambs in litter, number of kept sheep, lambing frequency, price of feed and its production costs, sheep breed, consumers' interest in lamb meat and thus possibilities of lambs domestic sale.

The above specification does not exhaust the whole problem, since not all but only the most important factors that can influence sheep-farming production profitability were mentioned. They are discussed more precisely in the further study section.

Polish sheep-farming went through splendor moments in 80th years of XX century. Sheep livestock population was about 5 million heads in 1986. After 1986 the number of sheep decreased, first slowly and almost in avalanche way after 1990 (Fig. 1). It has been remaining at the same level since 2001, i.e. about 300–330 thousands heads with slaughter lamb production at about 5 thousands tons (Fig. 2).

Breakdown of sheep-farming within the period of economic transformation mobilized the governmental and scientific environment to work out „Program of sheep live stock population improvement till 2010". The program was accepted for implementation in September of 1996, with 522.5 thousand heads sheep size. It assumed that the main sheep usage course was meat course and the basic objectives were as follows: quick rate of lambs growth, high fertility and maternal abilities of ewes, good quality features of carcass and better feed utilisation. Local sheep breeds (merino, sheep, Polish lowland sheep, Polish long-wool sheep and Polish mountainous sheep) were maternal breeds that made the main part of merchandise population. On the other hand, meat and fertile breeds were defined as paternal breeds [Rokicki 2005].

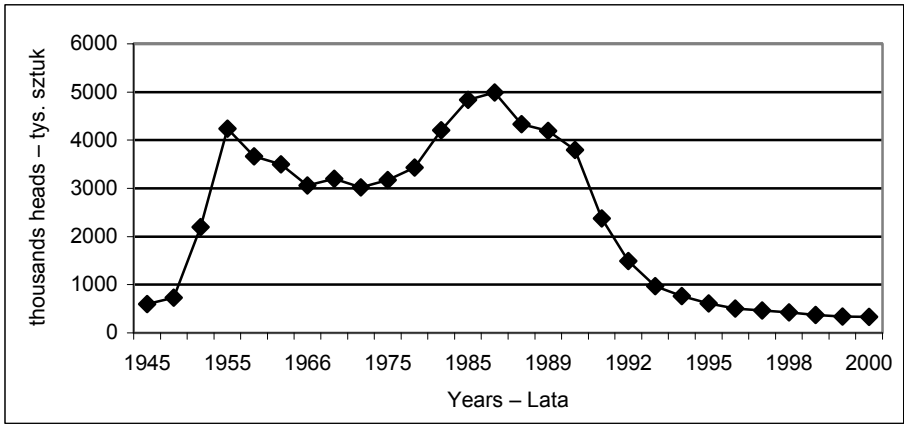

Fig. 1. Sheep population in Poland in 1945–2000
Rys 1. Pogłowie owiec w Polsce w latach 1945–2000

Source: Annals of Central Statistical Office – Źródło: Roczniki Statystyczne GUS z lat 1947–2000

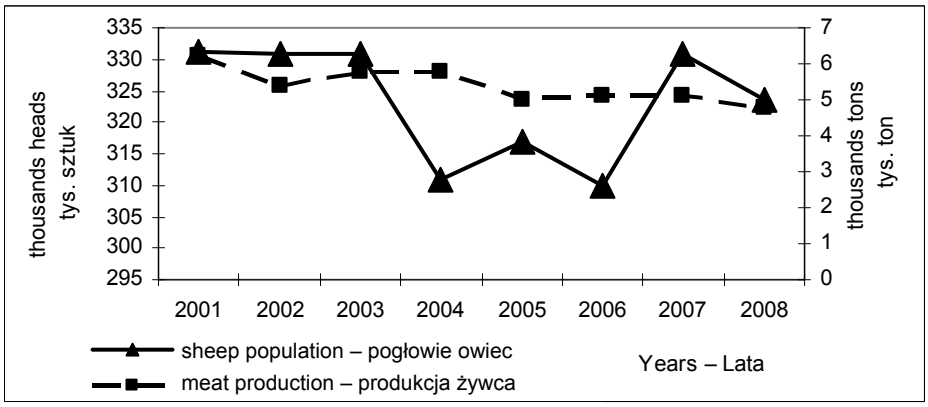

Fig. 2. Sheep population and lamb meat production in Poland in 2001–2008
Rys. 2. Pogłowie owiec i produkcja żywca jagnięcego w Polsce w latach 2001–2008

Source: Annals of Central Statistical Office – Źródło: Roczniki Statystyczne GUS z lat 2002–2008

Started in 1994 program of sheep fertility perfecting, whose objective was quick improvement of the whole sheep livestock population fertility and thus production of higher number of slaughter lambs made integral part of the „Program of sheep live stock population improvement till 2010". The program was suspended in 2004 in result of low results and lack of financial resources. Changes and reconstruction of domestic sheep-farming as assumed in „Program of sheep live stock population improvement till 2010" were supported with resources from biological progress fund [Program… 1995].

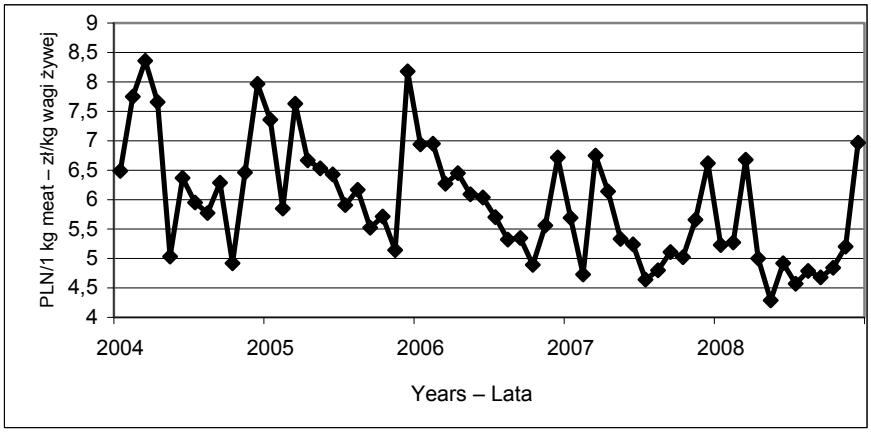

Fig. 3. Lamb price in Poland in 2004–2008
Rys. 3. Ceny skupu jagniąt w Polsce w latach 2004–2008

Source: Central Statistical Office, Institute of Organization and Management in Industry – Źródło: GUS, IERiGŻ-PIB

Table 1. Level of subsidies payment for sheep producers in 1997–2006
Tabela 1. Poziom stawek dotacji wypłacanych hodowcom w latach 1997–2006

Type of herd Rodzaj stada	Donation per sheep of mother herd in years (PLN/head) Dotacja na owcę stada matecznego w latach (zł/sztuka)				
	1997	2001	2003	2004	2006
Paternal breeding herd Stado zarodowe ojcowskie	165	155	120	120	92
Maternal breeding herd Stado zarodowe mateczne	120	110	90	90	70
Getter herd Stado reprodukcyjne	75	60	50	50	36
I level of fertility program I poziom programu plennego	165	155	120	-	
II level of fertility program II poziom programu plennego	120	110	90	-	
III level of fertility program III poziom programu plennego	75	60	50	-	
Herd of genetic resources Stado zasobów genetycznych	110	110	90	110	-
Merchandise herd Stado towarowe	50	40	30	32	23

Source: Institute of Organization and Management in Industry – Źródło: IERiGŻ-PIB

Paternal herds were engaged in raising rams (getters) and maternal – ewes. Sheep in getters herds were entered into breeding books. Rams were however not brought up in these herds. Objective of merchandise herds was slaughter sheep production and in this order they were using rams and ewes having been raised in breeding herds. From year to year funds for biological progress were lower (Table 1). In 1997 rates oscillated from

50 to 165 PLN depending on the herd type and from 23 to 92 PLN per mother annually in 2006. Declining donation rates influenced consolidation of fall down tendency of livestock population. That was because budgetary support constituted significant share in sheep-farming production incomes [Berdychowska 2004].

Next factor of influence on sheep-farming production profitability is price to be gained for lambs. It was depending on sales period and euro exchange rate since over 65% lambs were sold to European Union countries (Italy, Germany, France, Belgium). Purchasing prices were subject to seasonal oscillations (Fig. 4), the highest were in the period of Easter and Christmas. Considerable lower prices of lambs were noticed in years 2007–2008.

Prices as paid in EU countries for 100 kg lambs slaughter mass were similar in years 2004–2008. Seasonal oscillations occurred and the highest prices were reached in the period of Christmas (Fig. 4). Lambs prices were subject to seasonal oscillation also in Italy (Fig. 5), Peak prices occurred however in the period of Easter and Christmas. The lowest prices were observed in 2004–2005, and the highest in years 2006–2007. Thus, tendencies were opposite in relation to those observed in Poland.

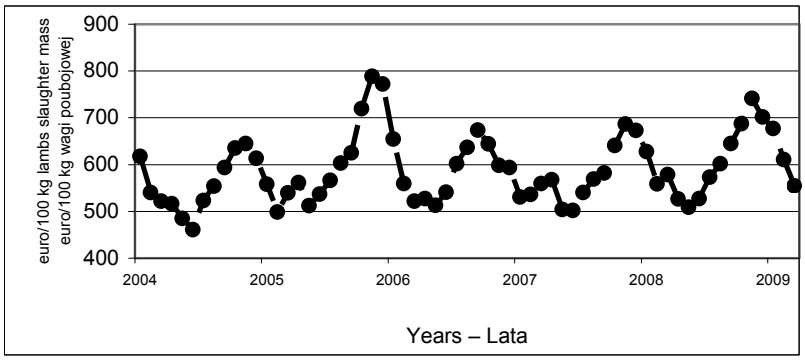

Fig. 4. Lamb price in EU countries in 2004–2009
Rys. 4. Ceny skupu jagniąt w krajach UE w latach 2004–2009

Source: Institute of Organization and Management in Industry − Źródło: IERiGŻ-PIB

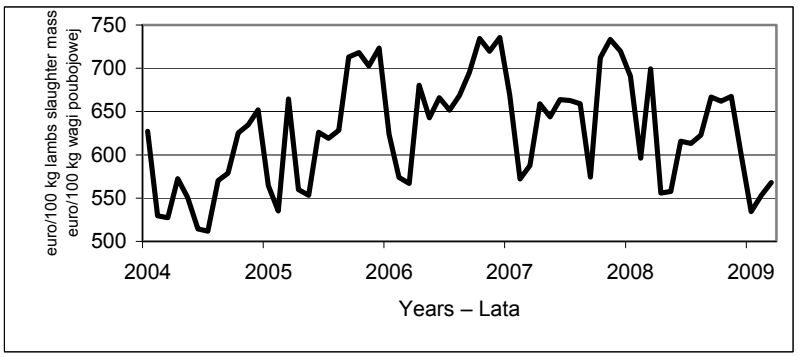

Fig. 5. Lamb price in Italy in 2004–2009
Rys. 5. Ceny skupu jagniąt we Włoszech w latach 2004–2009

Source: Institute of Organization and Management in Industry − Źródło: IERiGŻ-PIB

Direct surplus is used for comparison of various agricultural activities profitability. This calculation takes into account incomes gained from production and incurred directed costs as determined for structural head. In the case of sheep-farming production the meaning of structural head is mother sheep jointly with appropriate animal yield. Size of animal yield is determined on the grounds of herd turnover. Completed investigations made possible to define incomes from sales of lambs, wool, discarded sheep, breeding rams as well as from national support (Table. 2). In 2008 donation from Biological Progress

Table 2. The direct surplus in differences sheep herds in 2008
Tabela 2. Poziom nadwyżki bezpośredniej z produkcji owczarskiej w 2008 r. w zależności od charakteru stada

Specification Wyszczególnienie	Values of sheep production incomes and costs (PLN) Wielkość przychodów i kosztów w produkcji owiec (zł)	
	of paternal breeding line linii hodowlanej ojcowskiej	of maternal breeding line linii hodowlanej matecznej
I. Value of potentially merchandise production totally I. Wartość produkcji potencjalnie towarowej razem	420.27	393.59
Lambs – Jagnięta	262.20	269.10
Wool – Wełna	9.03	9.03
Sheep discarding – Brakowanie owiec	26.88	27.97
Weighting payment – Płatność za ważenie	84.20	49.53
Feed payment – Płatność paszowa	37.96	37.96
II. Direct costs totally – Koszty bezpośrednie razem	331.70	308.61
1. Purchased feed and own feed from potentially merchandise production – Pasze z zakupu i własne z produkcji potencjalnie towarowej	108.10	105.90
Nutritive fodder – Pasze treściwe	85.00	83.50
Protein concentrate – Koncentrat białkowy	9.10	8.40
Mineral additives – Dodatki mineralne	8.00	8.00
Fodder straw – Słoma pastewna	6.00	6.00
2. Own feed from non-merchandise products – Pasze własne z produktów nietowarowych	170.90	165.01
Green forage – Zielonka	36.45	34.95
Hay-silage – Sianokiszonka	119.41	115.50
Corn-silage – Kiszonka z kukurydzy	15.04	14.56
3. Other costs – Inne koszty	52.70	37.70
Medicaments and veterinary services – Lekarstwa i usługi weterynaryjne	14.00	14.00
Sheep clipping – Strzyża owiec	3.70	3.70
Union payments – Opłaty związkowe	35.00	20.00
Direct surplus – Nadwyżka bezpośrednia na:		
– 1 structural head – 1 szt. strukturalną	88.57	84.98
– 1 ha of the Main Feed Area – 1 ha GPP	805.18	772.56
– 1 PLN direct cost – 1 zł kosztów bezpośrednich	0.27	0.28
– 1 working hour – 1 rbh	6.42	6.16

Fund was replaced, in a way, by so called payment for weighing. Level of support on the score of lambs weighing was however significantly lower. 62% of sheep-farming production originated from lambs sales in paternal herd and 68% in maternal herd. Share of means obtained on the score of lambs weighing was higher in paternal herd (about 20%) than in maternal herd (12%). It resulted from differentiated weighing rates. After meeting the defined conditions there was a possibility for farmers to contest for feed payments and its share in incomes was 9–10%. 6–7% income was gained from discarded sheep sales. Wool made the lowest share in incomes structure (2%).

Bulky feed constituted 51–53% among direct costs and nutritive fodder − 32–34%. Feed appropriate for a ruminant was used for feeding, this was such feed as: silage of hay, silage of corn and green forage in summer period. In the time of lambs feeding mothers were fed with nutritive fodder too in a form of grain mixtures with fodder concentrates as well as with mineral additives. Share of other costs was 12–16% of all direct costs. Considerable expenditures in this group were related to payments on the score of servicing by sheep breeders union as well as with purchase of medicaments and veterinary services. Besides the direct costs as presented above it would be recommended to determine a part of indirect costs to be attributed to animal production. This makes no problems when single activity is conducted. A few activities are however conducted in a farm as a rule. Costs of fuels and lubricants, machinery repairs and preservation, working force hire, agricultural tax and tax of living room area, electric energy, payment for Agricultural Social Insurance Fund (KRUS) etc. could be included into indirect costs.

Direct surplus in terms of single structural head, of one working hour (rbh), as well as for 1 ha of the Main Feed Area (GPP) serves to compare profitability of various agricultural activities.

High share of lambs' sales incomes in the receipts structure means that better attention should paid for number of lambs in litter. In the case of sheep recreation, factors in Poland are very low. Only 1.1–1.3 lambs are brought up from single mother in the average [Hodowla… 2004]. Lambing occurs once a year as a rule. Breed of raised sheep gets high importance in the case lamb meat makes the main product from sheep. Meat quality is higher in the case of meat breeds.

Production scale is the most important factor that decides on production costs and farms competitiveness. It is of high impact on the type of applied technology and production process effectiveness [Juchniewicz 2004]. Production scale of sheep-breeding farms in the area of Podlaskie administration province was measured with number of mother sheep in the basic herd [Runowski 1994]. Investigations Rokicki performed in years 2003−2004 [2006] confirmed impact of maternal herd size on direct surplus size. Surplus level was higher in herds of 150 or 300 mothers than in herds in which 50 or 80 mothers were kept.

Feed price makes one of the most important factors of impact on sheep-farming production profitability and its production cost in the case of self-produced feed. Feed costs made over 80% of all indirect costs. Feeds generated in farm are mainly applied in order to feed sheep. They are mainly volume feed (silage of hay, silage of corn and green forage) as well as grain that are produced on own croplands. Size of expenditures for mineral fertilisers, crop protection products, diesel oil is of influence on borne production costs. General situation in agriculture and thus relation of means of production to generated-in-farm products prices should be noticed. Changes of nominal prices of production means in years 2004─2008 are shown on figures 6─8. Very high prices rise, by over 40%, occurred in 2008 in the case of mineral fertilisers. Similar relationship was observed in the case of selected means for production. Roundup pesticide price was raised by over 100% and Chwastox price by 20%.

Diesel oil prices were related to tendencies on worldwide markets. It should be however noticed that they were considerably increased from 3 PLN per litre in 2004 to 4.2 PLN at the beginning of 2008 (Fig. 8). Rates for delivered energy were increased from time to time. Its minimal prices increased by 24% in years 2004–2008.

Presented prices alterations for only selected production means show their permanent increasing tendency. In this respect prices of agricultural products should be increasing in order to balance disadvantageous effects of production means prices increasing. Oscillations of both sold agricultural products and purchased production means occurred in the period under investigations (Fig. 9). Possibility to introduce investments such as purchase of new machinery or their modernisation makes important aspect for farmers. Systematic rising of tractors (Fig. 10) and machinery (Fig. 11) prices results in their lower availability for farmers. Farmers can modernise their farms by taking advantage of Union's funds only. Prices of tractors were increased by over 50% and prices of machinery by over 100% in years 2004–2008. Occurring tendencies of production means and sold agricultural products prices are not favourable for farmers. In the case of sheep-farming production, decrease of paid-for-lambs prices as well as decrease of support level from national budget took additionally place.

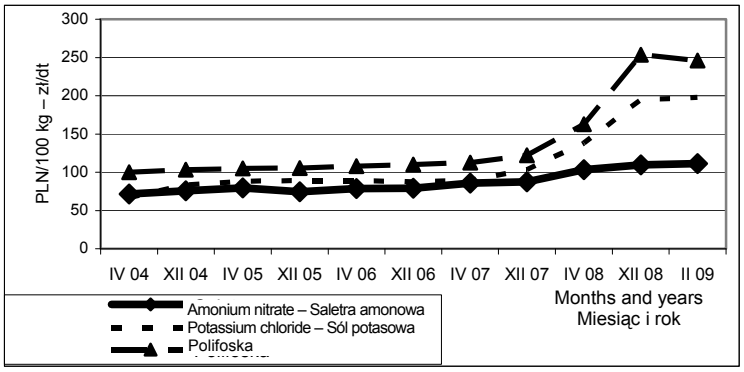

Fig. 6. The main fertitilizer price in 2004–2009
Rys. 6. Ceny podstawowych nawozów mineralnych w latach 2004–2009
Source: Institute of Organization and Management in Industry – Źródło: IERiGŻ-PIB

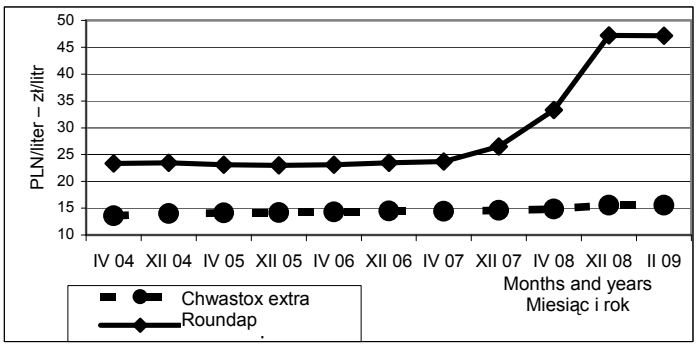

Fig. 7. The choose pesticide price in 2004–2009
Rys.7. Ceny wybranych środków ochrony roślin w latach 2004–2009
Source: Institute of Organization and Management in Industry, Źródło: IERiGŻ-PIB

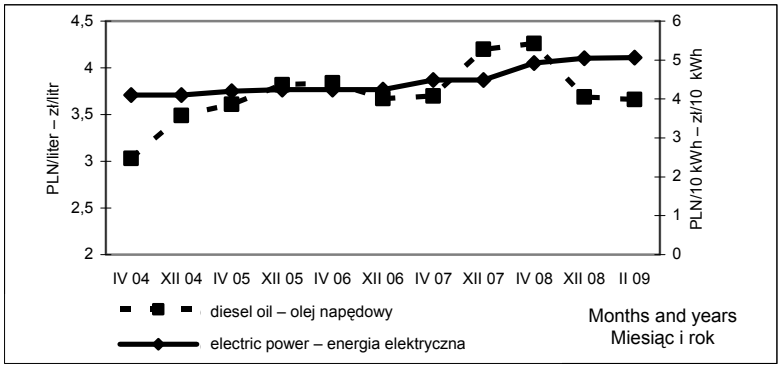

Fig. 8. The diesel oil and electric power price in 2004–2009
Rys. 8. Ceny oleju napędowego i energii elektrycznej w latach 2004–2009

Source: Institute of Organization and Management in Industry – Źródło: IERiGŻ-PIB

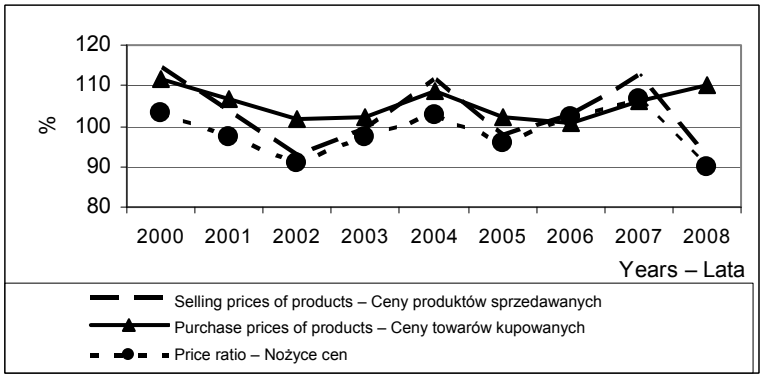

Fig. 9. The price ratio in 2000–2008
Rys. 9. Wskaźniki zmian cen w latach 2000–2008

Source: Central Statistical Office – Źródło: GUS

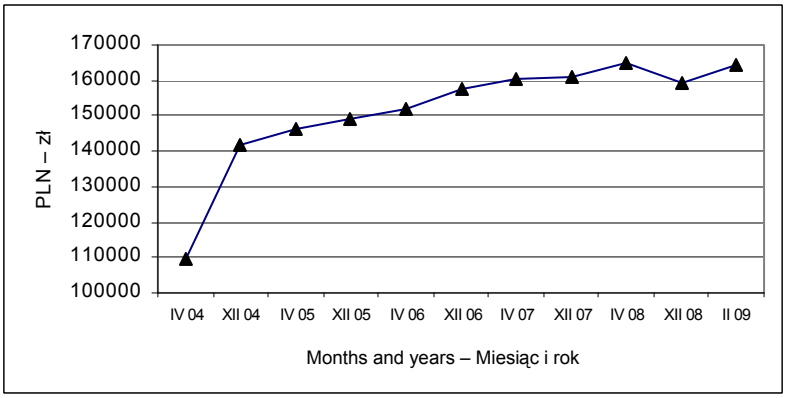

Fig. 10. The 90 kW tractors price in 2004–2009
Rys. 10. Ceny ciągnika o mocy 90 kW w latach 2004–2009

Source: Institute of Organization and Management in Industry – Źródło: IERiGŻ-PIB

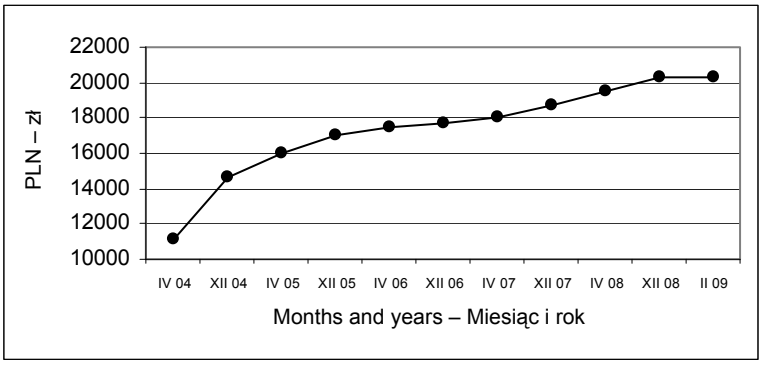

Fig. 11. The compost spreader price in 2004–2009
Rys. 11. Ceny rozrzutnika obornika (1-osiowy) w latach 2004–2009

Source: Institute of Organization and Management in Industry – Źródło: IERiGŻ-PIB

CONCLUSIONS

1. Sheep-farming production is no longer playing so high part in Poland as in 80th years of XX century. Meat production became leading production and wool production is currently practically of marginal importance.

2. Decrease of sheep-farming production support level from the national budget took place in the period under investigation. It means no interest of Polish economical deciders in sheep-farming development.

3. Price to be get for lambs and feed production costs made the most important factors of impact on sheep-farming production profitability.

4. Lambs purchase price in Poland was lowered and prices of production means were indicating increasing tendency. It resulted in deterioration of profitability.

5. In the future, profitability of sheep-farming production shall depend on creation of efficient inner market of lamb meat.

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Streszczenie. Produkcja owczarska na początku XXI w. ma mniejsze znaczenie niż w latach 80. XX w., o czym świadczy stan pogłowia owiec i produkcji mięsa. Wśród najważniejszych czynników wpływających na jej opłacalność wyróżniono poziom wsparcia krajowego, ceny skupu jagniąt, wskaźniki reprodukcji, koszty produkcji pasz. Po stronie wpływów duże znaczenie ma wsparcie unijne i krajowe, a po stronie wydatków koszty wytworzenia pasz własnych, które wynikają z nakładów poniesionych na zakup pasz, środków ochrony roślin, paliwa, energii. Bardzo ważnym czynnikiem jest zainteresowanie społeczeństwa konsumpcją mięsa jagnięcego.

Słowa kluczowe: owce, opłacalność hodowli, programy rolno-środowiskowe