

PROBLEMS OF MANAGEMENT PROCESSES OF MODERNIZATION OF DOMESTIC FARM EQUIPMENT IN A VIEW OF AVAILABLE FINANCIAL SOURCES
PROBLEMY ZARZĄDZANIA PROCESAMI MODERNIZACJI WYPOSAŻENIA
KRAJOWYCH GOSPODARSTW ROLNYCH W ŚWIECIE DOSTĘPNYCH ŹRÓDEŁ
FINANSOWANIA

Waldemar Lech BOJAR*, Marcin Grzech

University of Technology and Life Sciences in Bydgoszcz (UTP), The Management Engineering Department
Al. Prof. Kaliskiego 7, 85-789 Bydgoszcz, Poland
Tel./fax: +4852-3408192, Tel.+4852-3408180, email: waldemar.bojar@utp.edu.pl

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ABSTRACT

In the paper analysis of technical equipment modernization process of selected farms in Kujawy & Pomorze Province was made with questionnaire method. Not sufficient investment funds cause that farmers first of all buy worn equipment because of lower prices. They pay for cheaper machinery mostly with own funds while combines and tractors disburse partly from bank credits and/or loans and also the EU support. Introduction VAT from second hand machinery purchase after the accession markedly stops dynamism of equipment buying. In opinion of farmers advantage from second hand equipment getting are lower exploitation costs and also technological progress agreed with trends for simplification, specialization and concentration of farming. This is appeared in purchasing tractors of higher power and universal machinery of higher capacity and quality. Farmers decisions are rational because they consider both economical situation of their farms and increasing requirements of receivers of food raw materials.

Key words: farms, modernization, technical equipment, financing

ABSTRAKT

W pracy metodą kwestionariuszy dokonano analizy procesu modernizacji wyposażenia technicznego wybranych gospodarstw rolnych województwa kujawsko-pomorskiego. Niedostateczne środki na inwestycje powodują, że rolnicy głównie zakupują sprzęt używany z uwagi na niższe ceny. Maszyny tańsze kupują głównie za środki własne, natomiast kombajny i ciągniki finansują częściowo z kredytów i pożyczek bankowych oraz środków Unii Europejskiej. Wprowadzenie podatku VAT od zakupu maszyn używanych po akcesji wyraźnie zahamowało dynamikę zakupu sprzętu. Korzyścią z zaopatrzenia gospodarstw w sprzęt używany są według opinii rolników niższe koszty eksploatacji sprzętu, jak również postęp technologiczny zgodny z trendami upraszczania, specjalizacji i koncentracji produkcji rolnej, co przejawia się w zakupie ciągników o większej mocy oraz maszyn uniwersalnych o większej wydajności i jakości pracy. Decyzje rolników są racjonalne, gdyż uwzględniają zarówno sytuację ekonomiczną gospodarstw, jak również wzrastające wymagania odbiorców surowców żywnościowych.

Słowa kluczowe: gospodarstwa rolne, modernizacja, wyposażenie techniczne, finansowanie

DETAILED ABSTRACT

W pracy metodą kwestionariuszową i wywiadu kierowanego dokonano analizy procesu modernizacji wyposażenia technicznego wybranych gospodarstw rolnych województwa kujawsko-pomorskiego. Badania przeprowadzono w 50 dużych gospodarstwach rolnych przekraczających powierzchnię 50 ha użytków rolnych. Około 50% ankietowanych rolników mieściło się w przedziale wiekowym od 41 do 55 lat, co oznaczało, że byli średnio młodszy niż przeciętnie rolnicy w kraju i wyróżniali się nieco wyższym niż przeciętnie poziomem wykształcenia. Ich gospodarstwa miały wyższy niż średni obszar użytków rolnych, a także przeciętną dla kraju strukturę zasiewów z dominacją roślin zbożowych i oleistych.

Niedostateczne środki na inwestycje i brak możliwości upustów podatkowych (rolnicy nie są płatnikami podatku dochodowego) powodują, że rolnicy głównie zakupują sprzęt używany z powodu kilkakrotnie niższych cen niż maszyn nowych. Sprzęt tańszy kupują głównie za środki własne, natomiast kombajny i ciągniki finansują tylko częściowo ze środków własnych, a w przeważającej mierze z kredytów i pożyczek bankowych oraz z różnych transz środków Unii Europejskiej. Instrumenty finansowe umożliwiające rolnikom dofinansowywanie inwestycji modernizacyjnych obejmują m. in. takie programy, jak SAPARD, Program Rozwoju Obszarów Wiejskich 2007-2013, „Młody Rolnik”, czy Sektorowy Program Operacyjny. Wprowadzenie podatku VAT od zakupu maszyn używanych po przystąpieniu Polski do Unii Europejskiej wyraźnie zahamowało dynamikę zakupu sprzętu. Korzyścią z zaopatrzenia gospodarstw w sprzęt używany są według opinii rolników niższe koszty eksploatacji sprzętu, jak również postęp technologiczny zgodny z trendami upraszczania, specjalizacji i koncentracji produkcji rolnej, co przejawia się w zakupie ciągników o większej mocy oraz maszyn uniwersalnych o większej wydajności i jakości pracy. Do wad należy fizyczne zużycie sprzętu i ryzyko wzrostu kosztów eksploatacji w wyniku niespodziewanych, poważnych napraw.

Nadwyżka zakupów sprzętu używanego powoduje, że techniczna rekonstrukcja polskiego rolnictwa ma ciągle bardziej charakter restytucyjny niż modernizacyjny.

Wykonane studium wskazuje, że decyzje rolników o wymianie maszyn są racjonalne, gdyż uwzględniają zarówno sytuację ekonomiczną gospodarstw, jak również wzrastające wymagania odbiorców surowców żywnościowych. Należy podkreślić, że rolnicy w swoich decyzjach o zakupie sprzętu zmechanizowanego biorą także pod uwagę czynniki pozaekonomiczne, takie jest prestiż, komfort i bezpieczeństwo pracy, a także potrzebę

awansu cywilizacyjnego i zrównania szans własnych rodzin z rodzinami ze społeczności miejskich, czego przejawem jest właśnie postęp techniczny.

INTRODUCTION

A critical factor for agricultural economics is a selection of the most relevant machinery gangs for plant production of reasonable scale of activity [1]. Seasonal character of field operations forces a short annual period of farm machinery usage. For this reason necessary crop production machinery has to have respectively high capacity [2]. This let perform all crop operations in agro technical periods in time.

A short time of annual usage of farm machinery causes that equipment has to be usually depreciated during a small number of hours yearly. From other side, because of high potential delaying costs of operations [5, 6] or not performed operations machinery has to be so design to reach the highest effective capacity, be universal, ergonomic and low consuming energy [7, 14]. Such equipment guarantees low exploitation unit costs, high quality operations performance and also satisfying environment protection standards, safe and comfortable work conditions.

Simultaneously, mechanization means should be to the highest extent used during a year to minimize unit fixed costs. Because of a fact, that majority of domestic farms do not exceed are of 20 ha of farm land, a share of mechanization costs in total costs of output is very high and estimated for a level between 34 to 42 per cent (37.4 in average or more) [8, 15]. The next important problem is a high level of physical and moral depreciation of basic farm machinery in Poland. Increasing productivity of farming work in Poland connected with outflow of people to non-agricultural jobs and from other side a specialization of work merged with simplification of cropping plans and production technology and also a growth in scale of production force intensifying process of mechanization and automation of farming. Improvement of work conditions for farmers and their families is the next important reason of modernization of farm equipment in Poland. It should not be omitted civilization benefits which are brought over updating production technology and the most modern mechanization means, because the only progress in technical area can change positively attitude of farmers for changes and innovations at all and it can not be overestimated in modernization processes of farming. Among such civilization challenges one can mention application of farming technologies guaranteeing safe and healthy food, natural environment protection and humanization of work [3]. A prestige of better

equipped farmer than a neighbor is also important not economical premise let press farmers for buying more modern machinery.

Farm equipment in Poland requires still modernization because an average age of farm machinery is estimated for about fifteen years while tractors even nineteen ones old and more old tractors is still high and increases [16]. So, studying circumstances of the modernization acceleration belongs to important problems of Polish agriculture and agribusiness.

Some optimistic trends in this area one can observe in attitudes of Polish farmers from Kujawy & Pomorze region. The newest findings from 2006 shows that farmers are aware about a necessity of common machinery usage to be effective, because about 50 per cent of them have confirmed this opinion. Especially big (above 50 ha farm land) and better educated farmers were especially convinced that the only co-operation about farm equipment usage can give positive economical results. One can notice here positive impact of market mechanism on motivation of agricultural producers.

MATERIALS AND METHODS

The interview questionnaire survey was made in 2007 in Kujawy & Pomorze region. There were 50 farmers selected who had incomes exclusively from farming. Their farms can be classified as big area ones that means they have exceeded in average 50 ha farm land. Statistical data were also used to compare own findings with relevant data from other sources.

The main goal was analysis of impact of farm equipment investment funds on farm machinery modernization equipment. The questions put to respondents concerned situation of their farms and families and concerned analysis of period between 1999 and 2007. The questionnaire template has included both opened and closed questions as well, in total 11 questions: 9 opened and 2 closed.

About 50 per cent of asked farmers were between 41 and 55 years old while the only 15 per cent were above 55 years old what can meet that surveyed farmers are in average relatively young people. Majority of research farmers had vocational or secondary level of education (in total 72 per cent of research sample) while in Poland it is in average about 76 per cent of such agricultural producers. 64 per cent of research farms belongs to those having from 20,01 to 50 hectares of land, 16 per cent of farms has area between 15 and 20 ha and 20 per cent farms have area exceeded 50 Ha. In 53 per cent of surveyed farms two persons are fully employed, 35 per cent of the owners employ fully the only one person while in 12 per cent of research objects three fully employed workers

is used. Cropping plan structure in surveyed farm sample includes in average 61 per cent of cereals, 17 per cent of oil crops and the remaining part includes root and fodder plants. It is near average domestic plan production structure although other findings show even more share of cereals in Kujawy and Pomorze region [4].

52 per cent of questionnaire farmers have increased their farm land and bought machinery, 32 per cent of asked persons have bought machinery and 16 per cent of interlocutors neither have increased farm land area nor have bought machinery at all.

RESULTS

After accession of Poland to the EU some instruments of financing modernization investments in farms were introduced. They are as follows:

- SAPARD – Special Accession Programme for Agriculture and Rural Development),
- Rural Areas Development Program 2007-2013 (PROW 2007-2013)
- „Young Farmer” – („Młody Rolnik”)
- Sectorial Operating Program (SPO) named: „Restructuring and modernization of food sector and rural areas development” 2004-2006”. A one of supporting forms of that program was possibility to co-finance second hand farm machinery and devices purchases in the frame of Action 1.1. named: “Investments in farms” and Action 2.4. named: “Diversification of agricultural activity and those similar to agriculture to ensure differentiation of activities or alternative income sources” [9].

From mentioned above support can benefit each farmer satisfying defined requirements, e.g.

„Young Farmer” has to be less than 40 years old, relevant education or professional experience in a farm, own appropriate area of farm land, etc.

Beneficiaries of actions 1.1. and 2.4. of Sectorial Operating Program are obliged to provide suitable valuation program together with opinion of expert confirming that first, a purchase price of second hand equipment machines or devices do not exceed their market value and secondary, the equipment has technical properties necessary for the project realization and satisfies obligated norms and standards [9].

Purchases analysis in research farms

35 per cent of asked farmers satisfy requirements to take part in Young Farmer program.

On a base of the answers given by asked farmers was made analysis of bought machinery according to type and model of machinery, manufacturing year, technical

state, price, financing source and purchase date. One take attention machines bought soon before Poland accession to the EU from between 1999 and 2000 and also equipment purchased after 1st May 2004.

It was selected such time interval to take attention four years before the accession and four years after the accession.

One can meet that 84 per cent of surveyed farmers bought farm equipment and the only 16 per cent of them did not any purchases at all (see fig. 1).

About one forth of purchases (in quantification) was made at primary market and till 75 per cent machinery was bought at secondary market, what means that tempo of modernization of Polish agriculture is rather slow. One can stress that in majority, second hand machinery of domestic origin are served by Polish farmers themselves and bigger repairs are made by farm machinery service firms or private repairing small enterprises. Service of a second hand machinery of European Union and USA origin, which is more technically sophisticated, is realized by authorized service of manufacturers but small faults are also eliminated by farmers themselves. Such model of exploitation of second hand farm equipment gives two advantages: first, it decreases costs of repairing and secondary, let better use farms own resource of work which is rather surplus farming production factor in Poland.

Further analysis of research objects has shown that 44 per cent of the equipment was bought after the accession and 56 per cent before 2004. From the survey results one can find explanation of this phenomenon in introduction since 1st May 2004 VAT of 22 per cent value of the second hand farm equipment, what automatically caused growth in prices of that machinery.

The most often tractors were bought and they share 21

per cent purchasing machines.

All purchased tractors in opinion of farmers had good technical state. Second hand tractors share 56 per cent of total purchases of asked farmers. Mainly, such models like Polish tractors Ursus of 34,6 kW, and more heavy of 86 kW and among new tractors mainly Fendt, Zetor and John Deere were bought. The purchases were financed with three methods:

- 1) The EU subsidies plus bank credits and own funds.
- 2) Bank credits plus own funds.
- 3) The only own funds.

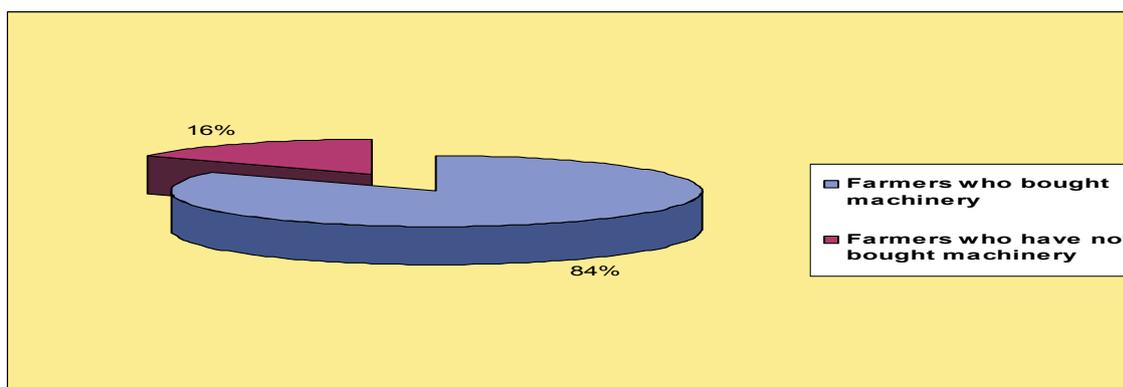
Thanks refunding of 50 per cent of machinery purchase price by the EU a farmer has to pay not much above 30 per cent of a price which would have to pay for new equipment. This also strongly explains a structure of farm equipment purchases in surveyed sample.

Between 1999/2000 and 2004 asked farmers have bought till 62 per cent of total number of tractors purchased between 1999 and 2007. VAT introduced in 2004 can partly explain this fact.

Disadvantage of supremacy of bought second hand equipment in total purchases is not desired structure of age of that equipment. It was confirmed by findings because the only 31 per cent of bought tractors had less than 5 years, about 15 per cent had 16 to 20 years and till 31 per cent had form 21 to 25 years. The remaining part has shared 23 per cent of total purchases. The oldest bought tractors were older than 27 years (fig. 2).

Thanks the purchases increment of average power of used by asked farmers energetic means was 0,925 kW per 1 ha calculating for every research farm. Such tendency met in research farms was also confirmed by other sources in whole country.

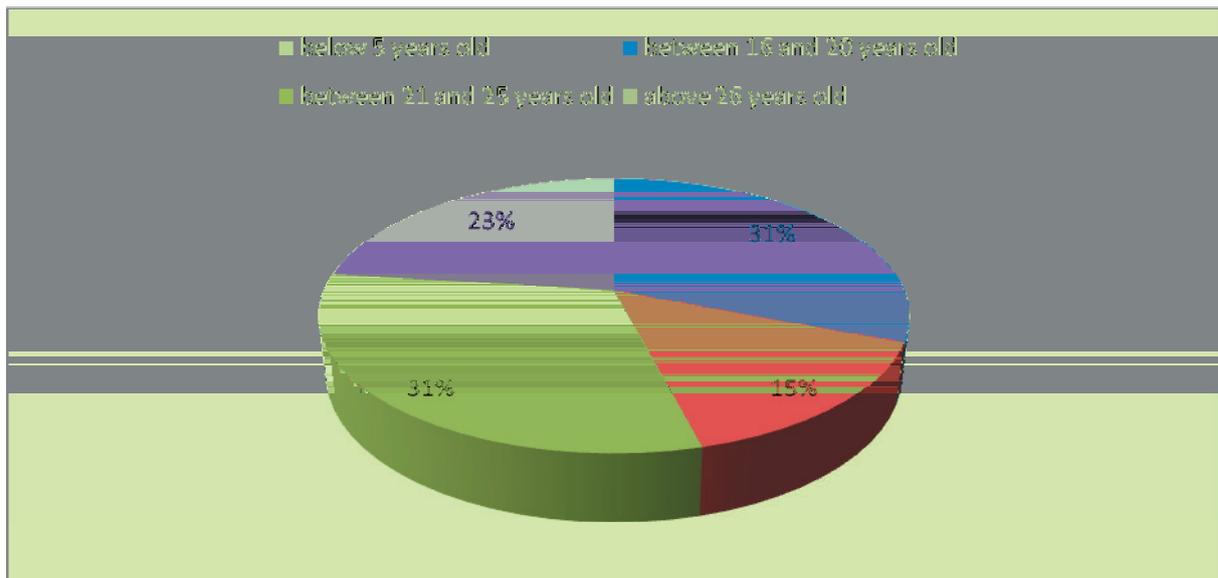
First, it can be explain with a fact that Polish farmers



All analytic data concerning farm equipment are expressed in quantification

Source: based on Marcin Grzech [2007]

Figure 1. Structure of researched farms according to someone bought machinery or not between 1999-2007



Source: based on Marcin Grzech [2007]

Figure 2. Share of tractors in analysed sample

practically do not liquidate old tractors and new ones are bought, so total resource of power is increased. Secondary, new getting tractors are going towards higher power. More tractors of medium and big power are bought. In 2006 the highest share (30.7 per cent) had tractors of power between 59 to 75 kW which became dominating and prevailing type of mechanization means at farms.

It is appeared gradually inclination for decreasing tractors purchase of power less than 18 kW and also from interval 37-59 kW” [10]. Worldwide changes in agricultural manufacturing technology, increasing specialization, farming concentration and ecology trends can explain described above processes.

Trailers shared 15 per cent of purchases and this seemed also a consequence of production specialization and concentration and what is resulted in bigger production scale.

10 per cent of total acquired equipment has shared combine harvesters, cropping and drilling aggregates and also balers. Asked farmers bought the only second hand combine harvesters of good and very good technical state and there exceed such models like Polish Bizon, Claas Dominator and Fortschritt E- 514. There were paid mainly for bank credits. One can highlight that purchases before and after the accession were less or more equal. It can be distinct determinant of modernization processes running in researched farms. (see fig. 3).

About 67 per cent of cropping and drilling aggregates were bought from second hand of good and very good

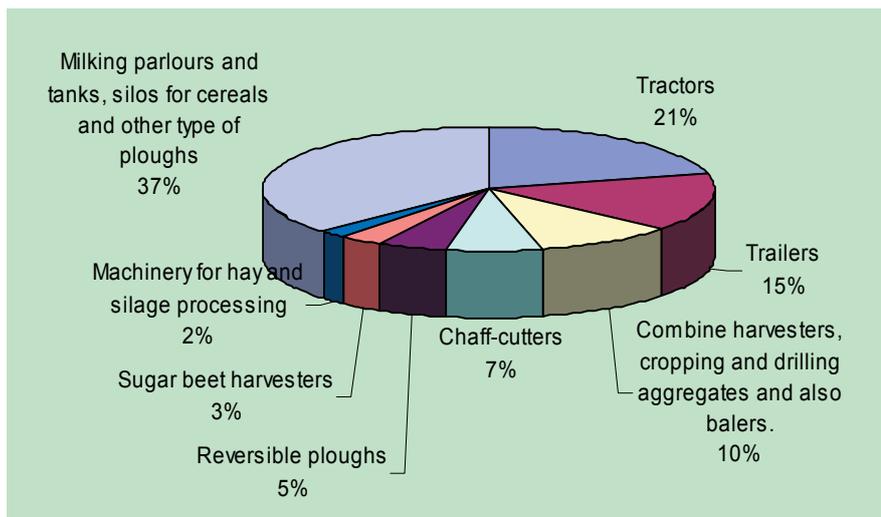
technical state. The new ones were paid mostly for the EU funds while worn aggregates partly with bank credit and loans merged with own financial means.

Majority of rolling and boxing balers were also got primarily from second hand. The oldest bought machines had more than 10 years and their price has not exceeded about one third of new machine price. The only 14 per cent of balers was purchased after the accession. Bank credits and loans merged with own financial means were basic financial sources of those investments.

7 per cent of total number of bought machinery shared chaff-cutter where three fourth were worn machines and the only 25 per cent new ones (fig. 3). Age of second hand chaff-cutters has exceeded 15 years but their average price was more than 10 times lower than price of new ones. For second hand machinery farmers paid with own money while new ones were bought with the EU funds.

5 per cent of purchased farm equipment shared rotary ploughs of 3, 4 and 5 ridges, sprayers and also loaders including front ones (fig. 3). The only worn ploughs and loaders of good technical state were purchased. Such plough models like 4-ridge Kverneland and leader „Tur” or „Weidemann” were bought the most willingly. Interlocutors have purchased sprayers the only at primary market and financed them from bank credits and the EU funds. A half of sprayers were got before the accession and a half of them after it.

3 per cent of completing persons decided to buy second hand sugar beet harvesters of one or two rows (fig. 3). A



Source: based on Marcin Grzech [2007]

Figure 3. Quantitative structure of farm machinery purchases

comparison of old and new equipment shows differences in prices exceeded 10 times. So, it explains why worn machines were bought exclusively. There were machines purchased wholly before the accession. Shrinking sugar beet market can explain also such effect.

2 per cent of respondents have purchased second hand and new machinery for hay and silage processing for own funds, because such equipment is relatively cheap (fig. 3).

The remaining, least part of bought farm equipment, included milking parlours and tanks, silos for cereals and other type of ploughs. They were purchased after the accession (fig. 3).

For the question whether buying second hand machinery is valuable till 75 per cent of respondents gave answer "Yes, because it is cheaper than new one". The answer "It is worthless" was given by 13 per cent respondents, because such machines have more damages and requires higher financial inputs for exploitation. In opinion of 8 per cent interlocutors' worn equipment is as same good as new one and 4 per cent thinks, that second hand machinery increases competitiveness of a farm, because this way one can buy more cheaper tools. Then save with this way money one can destine for other needs.

According to some findings above 43 per cent purchases on Internet auctions are made by persons of secondary education and a one third of the respondents have reached such level of education. There are in Internet several auctions where it is possible to buy worn farm equipment. Hence, one can conclude that e-commerce has increasing meaning as the information source and

the method of transactions concerning farm equipment. For 88 per cent asked farmers easy access to worn farm machinery accelerates farming mechanization and a tempo of made field operations.

Taking attention liaisons between changes of farm land area (see charter materials and method) and technical equipment in research farms one can meet that increasing farm land area implicates growth in need for mechanization means which will be able to face increasing request for bigger draught power and higher capacity could replace decreasing labour force resource. Similarly, transportation means request is higher and higher mainly due to bigger scale of production. One can conclude that one third of surveyed farmers which bought machinery, but did not increase farm land area, have to do it to replace shrinking labour resource and face strong technological requirements.

DISCUSSION

Observed behaviours of researched farmers in area of farm modernization are fully agreed with findings obtained by others [11, 12, 13]. Numerous researches show that farmers make rational decisions and invest money there where this can give the best economical results and own satisfaction. For this reason the most often they buy second hand equipment and take support from the EU or from banks when is necessary.

Surplus of worn equipment in farms causes that technical reconstruction of Polish agriculture has more restitution than modernizing character [13].

Buying machinery, domestic farmers face also quality and healthy food challenges resulted from horizontal and vertical integration processes especially from those connected to food delivery chain and aspiration of food consumers. They also try to satisfy aspiration of their families to reach welfare and work condition comparable to those which have people employing outside of agriculture, in urban areas. Such non-economical criteria create complicated systems of motivations which determine behaviours of Polish farmers in area of technical modernization and shape investments management methods.

CONCLUSIONS

External circumstances of sustainable agriculture prefer farm machinery of higher power and capacity, guaranteeing high quality operations performance, ergonomic and friendly for environment but very costly. In opposite, Polish small, in average, farms have not enough financial means to buy the newest most modern equipment. Even financial support of the EU in this scope is not sufficient.

The alternative is second hand equipment what was confirmed by the findings. An obstacle is obligated VAT for worn machinery which was introduced after Poland accession to the EU. It caused decreasing purchases of worn machinery. Disadvantage of such investment financing method is a very slow tempo or even stagnation occurred in process of renewing machinery. The advantage is less costly purchase and exploitation costs although opinions of farmers in this scope are differentiated. Parts of them think that a high probability of old equipment damaging is threaten for modernization process. Increasing power of tractors is at sure advantage of process of machinery exchange.

Made study shows that investment financing methods in surveyed farms are economically justified and rational, because the most expensive equipment is financed mainly from outside sources like bank credits and the EU means while cheap tools and devices are purchased with own money. The questionnaire survey showed that farmers take attention inside and outside conditions making decisions on technical farm equipment investments. They substitute labour and/or land with capital accumulated in farm machinery. They do it the only when it is economically justified and technologically necessary. Non-economical motivations are also very important because of work comfort and prestige.

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