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INNOVATIONS IN AGRICULTURAL HOLDINGS USING THE ASSETS FROM ZWRSP – TYPICAL SCOPE AND IMPORTANCE OF CONDUCTED CHANGES

INNOWACJE W GOSPODARSTWACH ROLNICZYCH UŻYTKUJĄCYCH AKTYWA POCHODZĄCE Z ZWRSP – ZAKRES RODZAJOWY I ZNACZENIE WPROWADZANYCH ZMIAN

Introduction

Changes in the model of competition in contemporary world lead to the trend as if the innovations are the main source of competitive advantage. The undeniable fact is that the scale and range of introduced innovation depends from department, or sector of business entity activity. Within the sector of high tech their level is significantly higher in comparison to the sectors of lower tech or in agriculture. Independently from the obvious limitations in range of creation and implementation of innovations in agriculture, every aspect of innovative activity in farms should be considered as legitimate and necessary. Małgorzata Górka and Maria Ruda¹ highlight that such activity is important from the point of view of its modernization, and it is connected not only with spreading of all the novelties, but also with improvements of existing states. It may contribute to increase in production efficiency and lowering of its costs and therefore the betterment of competitiveness in internal and international markets. Level and possibilities of carrying out innovative activities in agriculture are connected with the specific features of this sector. Halina Kałuża and Monika Rytel² point out the features such as: long production cycles, dependence of production from its quality of production space and seasonality of production. Mirosław Struś and Julian Kalinowski³ claim

¹ M. Górka, M. Ruda, *Innowacje w gospodarstwach rolniczych województwa podkarpackiego*. Nierówności Społeczne a Wzrost Gospodarczy 2012, No. 29, pp. 126–131

² H. Kałuża, M. Rytel, *Innowacyjność w świetle studium przypadku gospodarstw rolniczych z gminy Mokobody*. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 2014, No. XII(5), pp. 68–69.

³ M. Struś, J. Kalinowski, *Dylematy wdrażania innowacji na obszarach wiejskich*. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 2015, No. 17(3), pp. 367–372.

that the conceptions aiming to the modernization of rural areas in isolation of traditions and internal conditions are not the proper ones. Authors indicate the persistence of economical motives of innovative actions conducted by the investigated farmers. They conclude that the desired innovation is the one which builds the foundations of persistent market, based on relations between farmers and recipients, contributing to the durability of the system afforded by the sustainable development. Agreeing with such approach it is needed to show, that from the subject point of view (which is agriculture producing) introducing by him the innovations in synergic connection of competitiveness betterment on the micro and macro level and basis of improving the conditions of living in farms in economical and society sense.

Innovative activity of business entity and for the most its level and range of types of introduced innovations depends from their size. Such regularity is commonly present among industry enterprises in Poland⁴. Such tendency can be extrapolated on farms. The research of Earl A. Heady shows that⁵. Results from these are that innovations at first and more are introduced by agricultural producers of high production potential. By the thoughts of Wojciech Józwiak and others⁶ it is connected mostly with the possessed capital and possibility of funding the innovations from own resources. Bigger farms, in which owners are hiring employed people, incur credits and lease the land are predisposed into introducing the new solutions. Authors very clearly point that scale effects of production effect on tendency and ability of farm owners for innovative actions. Wojciech Ziętara⁷ notes that because of the demand barrier on agricultural products, the main and real way of improving the scale of production in discussed sector of economy is the growth of farm surfaces. Important research problem in such context is rating of innovative activity of farms using the resource of state treasury agricultural property (ZWRSP), which have the above average production potential resulting from the possessed area of lands.

Measurable effect of innovative activity of business subjects are introduced by them innovations. Czesław Maziarz⁸ defines it as the new makings or production processes, but also the ideas which serves raising of the prestige of society and trigger the teamwork. Precisely the concept by Józef Ryznar⁹ claims that agricultural innovations are every new idea and concept used to improve

⁴ *Działalność innowacyjna przedsiębiorstw w latach 2013–2015*. GUS, Warszawa 2016.

⁵ E.A. Heady, *Ekonomika produkcji rolniczej*. Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa 1967.

⁶ W. Józwiak, A. Kagan, Z. Mirkowska, *Innowacje w polskich gospodarstwach rolnych, zakres ich wdrażania i znaczenie*. Zagadnienia Ekonomiki Rolnej 2012, No. 3, pp. 3–27.

⁷ W. Ziętara, *Dzierżawa ziemi w gospodarstwach rolniczych jako podmiotach biogospodarki*. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 2016, No. 18(2), pp. 303–309.

⁸ Cz. Maziarz, *Andragogika rolnicza*. Wydawnictwo Naukowe PWN, Warszawa 1977.

⁹ J. Ryznar, *Doradztwo rolnicze w zarysie*. AR 70, Wrocław 1995.

production processes, treatments around the farms and home and the devices which make work easier or more efficient. Author expands this category with every making of human activity, pattern of actions or values highlights, that they were not present in the farm or village before. Kazimierz Michałowski and Eugeniusz Wiśniewski¹⁰ emphasize the purposefulness of conducted changes in agricultural activity, suggesting that these are the only one which can be considered as innovations. Authors proceed from the assumption that the novelty, which does not change anything and allows only for the enterprise to keep the “status quo” should not be considered as an innovation. Multiaspect approach to the concept of innovation causes acceptance of various breakdown criteria. Theoretical assumptions about such issue are present in many research elaborations. Such criteria, connected mostly with originality of conducted changes, mechanism of stimulation of innovations, subject and effects of innovations, personal and institutional coupling, size and range of effects of introduction of innovations or the point of reference (macro, meso or micro – economical). From the point of view of analysis on mesoeconomical level (which is the agricultural sector), the most important are the ones connected with the subject of innovations and originality of introduced changes. According to the information included in Oslo Manual¹¹, developed by Eurostat and OECD, there are four types of innovations: product, process, organization and marketing¹². Innovations are possible to divide into incremental, radical, new technological systems and dissemination innovations. Stefan Marciniak¹³ thinks that the incremental innovations (consisting in improving or modernization of primary innovation) has the biggest meaning. He points out also that it depends from the stage of development of one economy and its strategy of growth and character of implemented innovations. Innovations may be distinguished by the criteria of their novelties among the point of reference. Piotr Cyrek¹⁴ stands out the absolute innovations – understood as a solution

¹⁰ K. Michałowski, E. Wiśniewski, *Innowacyjne produkty rolnicze w rejonie północno-wschodniej Polski*, [In:] *Innowacje i innowacyjność w sektorze agrobiznesu*. Ed. M. Adamowicz. Wydawnictwo SGGW, Warszawa 2008.

¹¹ Podręcznik Oslo, *Zasady gromadzenia i interpretacji danych dotyczących innowacji. Pomiar działalności naukowej i technicznej* (3rd ed.). OECD and Eurostat, Warszawa 2008.

¹² Product innovations include new products in as goods and services and all of changes in products, which already exist. Process innovations (which main aim is to lower the costs of production) are changes within the process of creation of product of methods of its delivery for the client. Organization innovations are mostly new methods of organization and managing the enterprise, which aim is to lower the organizational costs, improvement in effectiveness and streamlining work. Marketing innovations relate to new marketing methods such as: modification of product look, its package, changes in promotion systems and price policy.

¹³ S. Marciniak, *Innowacyjność i konkurencyjność gospodarki*. Wyd. Ch. Beck, Warszawa 2010.

¹⁴ P. Cyrek, *Innowacyjność determinantą konkurencyjności przedsiębiorstw przemysłu spożywczego*, [In:] *Transfer wiedzy i działań innowacyjnych w obszarze agrobiznesu*. Eds.

introduced for the first time in global world economic system and relative innovations (imitative) – occurring as a new one only in scale of country, market or one enterprise. Agricultural producers use various possibilities of conducting the changes in economy.

On the level of farm Augustyn Woś¹⁵ divided them on the hitherto used:

–creations, which are: means and tools of work and technical means of production, seed breed materials, chemical resources, farming improvements conducted with construction, transport, storage, supply and market of farming products,

–means of farm – simple and complex technological operations, sections and branches of production,

–concepts and methods of managing the farm, which are connected with aims, directions, structure and production economics.

Józwiak and others¹⁶ specified that approach by giving some range of innovative activities used in modern agriculture. Introduced in various farms various forms of innovations depends from the economic condition of farms, production potential, openness for changes, way of managing, but mostly they should be the reaction on challenges and changes on the market. From that thing there is justified need of research defining the sectors of innovative actions of farm producers, especially the ones that have high scale of production which are the farms using ZWRSP.

Methodology of research and source material

Presented in this elaboration research results are part of a bigger material obtained within the actions of research project realized by University of Warmia and Mazury in Olsztyn and the agency of agricultural property local branch in Olsztyn. Subject of these research was the innovation activity of homesteads. The article concentrates on the specification of types of range and the meaning of innovative solutions introduced within the farms using the assets from ZWRSP in warmińsko-mazurskie voivodeship. Operationalization of proposed by Woś¹⁷ approach to the classification of innovations, in own research, they were grouped in: general economic, in plant and animal production. To the group of general economic innovations included: joining the producer group, change of the production profile, in a range of promotion and way of distribution, introduction the new products to the offer, changes in a way of providing services or new services, hiring permanent and seasonal workers, upgrading the qualifications of

S. Makarski, P. Cyrek, S. Dybka, A. Kasprzyk. Wyd. Uniwersytetu Rzeszowskiego, Rzeszów 2007, pp. 7–14.

¹⁵ A. Woś, *Rozwój i postęp w rolnictwie polskim*. Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa 1987, p. 52.

¹⁶ W. Józwiak, A. Kagan, Z. Mirkowska, op. cit.

¹⁷ A. Woś, op. cit., p. 46.

owner, realization of cooperation with agricultural advisory center (ODR), using the services of subcontractors, introduction of agricultural accounting, purchasing or lease of land, usage of computer tech. Innovations in plant production were: introduction of ecological plants, new technologies of cultivation, new ways of fertilization, new breed of plants, new machines and devices, new seeding materials and new sources of protection. During the studies the concept of types of innovations introduced in animal producing were addressed, such as: new breed and species of breeding animals, purchasing of new machines and devices, new feeds and mineral additions, modernization of farm premises, improvement of animal welfare, increase in population. Such approach takes into account the specifics of farm production and is comparable with one which is applicable, in international standards of researches of enterprises divided by innovations, in which there are product, process, organization innovations¹⁸. According to this method, it has been adopted that innovations are also the new solutions introduced in a farm, even if they were introduced earlier in any different subjects.

Main source material were primary data obtained by surveys, using the technique of questionnaire surveys. Selection of units was non-random (target selection). Condition of participation in survey was: conduction of farm activity within warmińsko-mazurskie voivodeship, usage in this activity the assets from ZWRSP, conducting innovative activity, cooperation of managers of farms with advisory services. Surveys were realized with the cooperation of Warmińsko-Mazurski Agricultural Advisory Center in Olsztyn. Questionnaires were delivered to the selected farms with the use of agricultural advisor's network. They were done with the owners of farms during the June–July in 2016. Research sample was 200 units and full data was gathered from 138 farms. Average size of surface of researched subjects was 107,5 ha. The biggest group of farms, among the one that answered positively for the participation in research process, had 50–100 ha, the smallest groups were subjects with surface of 300–500 ha and above 500 ha. Farms were spread within every county of warmińsko-mazurskie voivodeship. Population of the samples does not give any assumptions as to generalization of conclusions to the whole population of farms using ZWRSP in warmińsko-mazurskie voivodeship, but it may be the basis to formulate the general tendencies within them.

Research results and discussion

Introducing the innovative solutions, the farm producers have to connect changing needs of their usage within farms with the scientific and technological achievements possible to use in this special kind of production. Conducted research points out that mostly that were innovations of general economic kind and innovations in animal production. Modern solutions were used by farmers using ZWRSP on the small scale in animal production (tab .1). This was the result of two

¹⁸ Podręcznik Oslo, op. cit.

things. Firstly, the significant level of innovations of general economic kind was connected with scale of production of researched subjects. Managing in bigger subjects is connected with its organization and improvements in production economy. Secondly in researched farms, plant production was bigger than animal production, hence bigger number of innovations with plant production. Advantage of innovation needs in plant production technology (in comparison to animal production) Kalinowski and others¹⁹ explain that with present long-term stagnation in animal production. Struś and Kalinowski²⁰ point out that plant production has bigger interest within farmers than animal production, as the second one is more capital-intensive, needs more labor expenditures and is less profitable.

Table 1

The number and structure of innovations (%) conducted in examined farms

Specification	Number of innovations	Innovation structure (%)
General economic innovations	379	39
Plant production innovations	367	38
Animal production innovations	228	23
Total	974	100

Source: own study.

Innovations on the level of homestead may be formed within various activities. Half of the respondents claimed that the most important innovation of general-economic type was the improvement of owners qualification. Almost every third researched farmer thought that important innovation of this kind is hiring the seasonal works, usage of computer tech in agriculture production and improving the production potential as a lease of land or buying new lands. Respondents noted, that important general economic innovations in their farms were: improving the qualifications of workers and introducing the agricultural accounting. Much lesser percentage of respondents did realize the innovative activity within which were used: services of subcontractors, changes in a way of selling the products, hiring workers permanently, conducting the cooperation with agricultural advisory center, introduction of new service or change the way of provision of services. Few respondents took actions such as: introduction of new products, changes in a way of distribution or in a range of promotion, changes in production profile and joining the producer group (fig. 1.). Results gained within the own studies may vary from the one presented by Halina Kałuża and Agnieszka Ginter²¹. Authors qualified to the most important general-economic type of innovations: purchasing the new

¹⁹ J. Kalinowski, D. Gonet, M. Stachowiak, *Ewolucja potrzeb innowacyjnych rolników*. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 2014, No 16(3), pp. 120–125.

²⁰ M. Struś, J. Kalinowski, op. cit.

²¹ H. Kałuża, A. Ginter, *Innowacje w gospodarstwach rolniczych młodych rolników*. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu 2014, No. 361, p. 90.

machines, devices, tractors, new forms of organization of work, building or rebuilding the farm premises and searching the new ways of income, usage of computer tech and arranging the bypass of farm. These divergences may be explained as a result of specifics of examined population in both of researches.

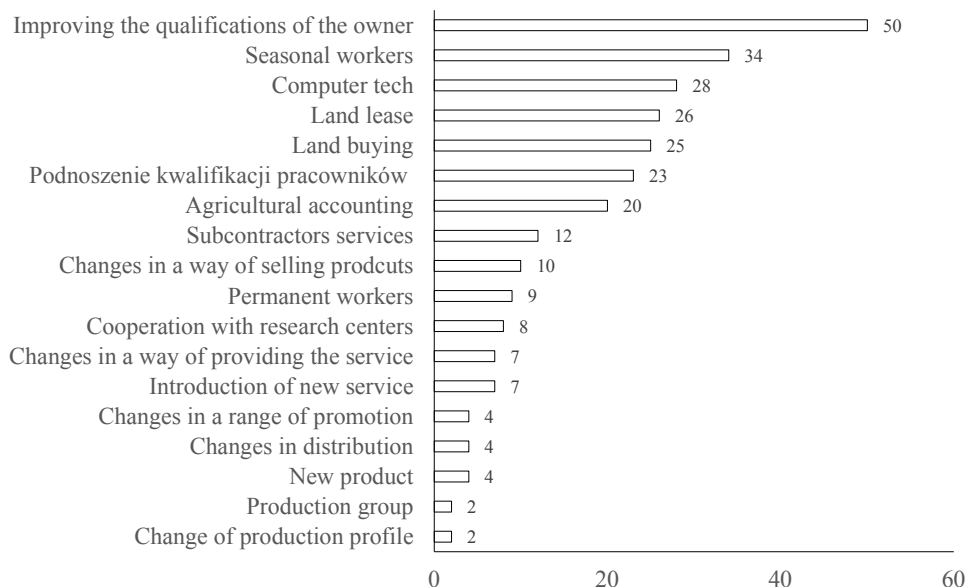


Figure 1

Type of general economic innovations (% of indications)

Source: own study.

The positive fact is that among the area of innovative activity, farmers mostly highlight improvement of qualification of owner and workers and also the usage of changes in managing the farm, by usage of IT technologies and introducing the cost accounting in decision making. Knowledge is strategic resource in development of the areas of low endogenous potential, in which are rural areas. Brygida Klemens²² points out that it is necessary in such context to ease the access to the knowledge to create the staff capable of creative activities and innovative ones. Piotr Gradziuk²³, after Wilkin²⁴ highlights, that the human and his abilities

²² B. Klemens B. 2015. *Znaczenie transferu wiedzy i edukacji dla obszarów wiejskich*, [In:] *Wiedza i edukacja w rozwoju obszarów wiejskich*. Eds. M. Wójcik, K. Czapiewski. Acta Universitatis Lodzianis, Folia Geographica Socio-Oeconomica, Wydawnictwo Uniwersytetu Łódzkiego, Vol. 20, pp. 5–21.

²³ B. Gradziuk, *Kapitał ludzki elitarnych gospodarstw rolniczych*. *Więś i Rolnictwo* 2008, No. 2(139), pp. 86–103.

²⁴ J. Wilkin J. 2006. *Człowiek w ekonomii, czyli o kwestii konwersji zasobów ludzkich w kapitał*, [In:] *Jednostkowe i społeczne zasoby wsi*. Ed. K. Szafranec. IRWiR PAN, Warszawa 2006, pp. 97–106.

and attitude is the biggest production potential. Self-awareness of researched farmers in this range shows their conviction that in changing market conditions and bigger competition within inside and international market, possessing certain information and knowledge is an essential condition of usage in economical practice. Beneficial were as well the changes connected with the desire of enlarging the scale of production, which is land lease and buying. Disturbing phenomenon was as well, due to the conducted research by Julian Kalinowski and others²⁵ pointing out the needs of innovative farmers in marketing area, is the small number of introductions of innovations of such type, within the tested population of farmers. It indicates the pro-production motives of innovative activities by farmers.

Scale of carried out business activity, as highlighted before influences mostly the level of innovative activity of subjects. Households were divided in terms of total surface and participation of ZWRSP in assets. It is needed to point out that the growth of share of lands from ZWRSP was accompanied by the bigger total surface of farm. With the share of assets of ZWRSP up to 25% average surface of farms was about 86 ha, while when the lease was over 75% of land, the surface was over double bigger (164 ha). Conducted analysis show that beside the most important, general-economic innovation implemented in tested households (improving the qualifications of owner) in groups of respondents divided by the share of assets from ZWRSP, the opinions about implemented innovations of general-economic type were diverse (tab. 2.) In group of examined enterprises, using in their activity up to 25% of assets from ZWRSP, as to the most important innovations of general-economic type: hiring the seasonal workers, usage of computer tech, improving the qualifications of workers and introduction of agricultural accountancy, lease or buying the lands and usage of subcontractors. Rest of the innovations were pointed out less more (1–9% of indications). Respondents using in their activity from 26–50% of assets from ZWRSP proposed some other order of most significant innovations which were: land lease, hiring seasonal workers, buying land, usage of computer tech, improving the qualifications of workers and introduction of agriculture accountancy. In a case of farmers using in their activity 51–75% of assets from ZWRSP, the most often realized, general-economic innovations were: land buying, hiring the seasonal workers, improving the qualifications of workers, land lease, usage of computer tech, introduction of agricultural accountancy and hiring the workers permanently. In group of respondents using in their activity above 75% assets from ZWRSP to the most important general-economic innovations, these were qualified: land lease, hiring the seasonal workers, usage of computer tech and changes in the way of providing the services, improving the qualifications of workers, as well as beginning the cooperation with research centers, and usage of subcontractors services.

²⁵ J. Kalinowski, D. Gonet, M. Stachowiak, *op. cit.*

Table 2

The general economic innovations in examined farms with consideration of sharing of assets from ZWRSP (% of indications)

Specification	Share of ZWRSP in farm assets			
	up to 25%	26–50%	51–75%	above 75%
	(% of indications)			
Improving the qualifications of the owner	46	56	45	71
Land lease	21	39	20	57
Hiring the seasonal workers	37	33	30	43
Usage of computer tech	27	28	20	43
Changes in a way of selling products	7	6	10	43
Introduction of the new service	9	3	5	29
Changes in a way of providing service	4	8	10	29
Introduction of new product to the offer	1	6	0	29
Using of the service of subcontractors	15	6	5	29
Cooperation with research centers	7	0	5	29
Improving the qualification of workers	24	19	25	29
Land buying	19	31	35	14
Change of production profile	0	3	5	14
Hiring the workers permanently	4	11	15	14
Changes in a way of promotion	3	3	0	14
Changes in a way of distribution	4	3	0	14
Introduction of agricultural accountancy	24	19	15	0
Joining the producers group	1	0	5	0

Source: own study.

Presented results point out some of tendencies occurring between the type of implemented innovations of general-economic type and share of ZWRSP in assets of farms. Range of implementations connected with introduction of agricultural accountancy was decreasing (down to the zero) along with the growth of this share. Such situation was the result of the fact, that such solution was present earlier in bigger farms. The biggest differences between households using above 75% of ZWRSP assets and the rest of groups was about the changes in: production profile, way of providing the services, range of promotion and introduction to the offer the new product, but mostly by the fact of cooperation with research centers. In bigger households, using above 75% of assets from ZWRSP, more often used solutions are the ones areas of innovative activities which come from gaining and using in

practice the results of research works and R+D actions and implementation of product and marketing innovations. In the light of Poland wide trend of lack of cooperation of business subjects with R&D units, this fact should be specifically highlighted. It confirms the interdependence present as well between tendency to cooperate with the R&D sphere and size of subject, independently from the section of national economy²⁶. Zofia Mirkowska²⁷ highlight that according to the theory of induced development in agriculture, innovations arise beyond this section of economy. Households adapts most of the time the innovations arising somewhere else, and cooperation with R&D favors the diffusion of innovation up to this group of subjects. Bigger impulse to introduction of product and marketing innovations in big households is connected with bigger and bigger dependence of gained economical results with the market conditions and enlargement of range of food market integration, it means the agriculture with the rest of the sectors of national economy²⁸.

Innovative solutions were introduced also in spite of plant production. The most frequent ones usage of new seed materials and new means of protection of plants. Half of the tested farmers in plant production used new machines and devices. Almost the third from listeners used in plant production new species and varieties of plants and new fertilizers. Less of the examined introduced new complex cultivation technologies and ecological ones (fig. 2.)

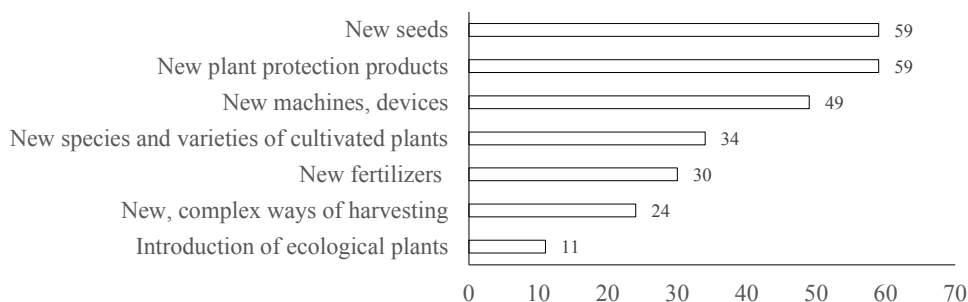


Figure 2
Innovations in plant production (% of indications)
Source: own study.

²⁶ The bigger enterprise is, the more often it cooperated within the range of innovative activity. Percentage of big (250 and more workers) industry enterprises which cooperated within innovative activity was almost three time bigger than presented by smaller enterprises (from 10 up to 49 workers). Within the service enterprises the same tendency was present, however differences were twice time smaller (*Działalność...*).

²⁷ Z. Mirkowska, *Innowacje i innowacyjna gospodarka a rolnictwo. Zagadnienia Ekonomiki Rolnej* 2010, No. 4, pp. 122–133.

²⁸ A. Czyżewski, A. Grzelak, *Rolnictwo w Polsce na tle sytuacji ogólnoeconomicznej w kraju w okresie kryzysu 2007–2009. Roczniki Nauk Rolniczych. Seria G, Ekonomika Rolnictwa* 2011, No. 98(3), pp. 21–31.

Big percentage of indications of innovations connected with the use of new ways of plant protection, was by the result of Arkadiusz Piwowar²⁹ research, from the significant progress in terms of production among previous years. Results of own research are convergent with the ones gained by Kalinowski and others³⁰, which noted advantage of needs of farmers, which mostly was about introduction of novelties to means of morphological measures and protective ones. Implementation such innovations is connected with the persistent tendency of searching by the farmers, solutions allowing the betterment of effectiveness of housekeeping by lowering the costs of plant production. Among innovations in plant production still the high significance are the process innovations connected with buying the new machines and devices. They allow to lower systematically the technological gap presented both between farms in inside and outside markets.

Groups of respondents divided because of share of assets from ZWRSP, the opinions about implementations of the most important innovations in plant production were rather similar. There was considered that the most realized innovations in plant production were: usage of production of new seed material, usage of new machines and devices and devices for production of the new means of plant protection and as well new specie and varieties of plants as well with new fertilizers. According to the respondents less meaning had the usage of new complex technologies of harvesting and introduction of ecological plants (tab. 3). In farms using more than 75% of assets from ZWRSP there was domination of innovative changes connected with the use of new seeds. Relatively smaller significance, in comparison to other groups, was about buying new machines and devices for agricultural production.

Table 3

Innovations in plant productions with consideration of sharing assets from ZWRSP (% of indications)

Specification	Share of ZWRSP in farms assets			
	up to 25%	26–50%	51–75%	above 75%
	(% of indications)			
Seed material	54	67	55	71
New machines, device for agricultural production	54	47	45	29
New means of plant protection	52	62	70	57

²⁹ A. Piwowar, *Postęp w dziedzinie chemicznej ochrony roślin w Polsce i jego determinanty*. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego 2012, No. 12(27), 1, pp. 138–148.

³⁰ J. Kalinowski, D. Gonet, M. Stachowiak, op. cit.

New fertilizers	34	14	40	29
New species and varieties of cultivated plants	30	36	40	57
New comprehensive cultivation technologies	22	22	25	43
Introduction of ecological plant	7	14	5	43

Source: own study.

In the studies the subject of innovations and animal production was present. In examined population the most common innovations within animal production were: increasing the number of animals, betterment of animal welfare, modernization of farm premises, new feeds and mineral additives, or purchasing of the new machines or devices. New breeds or species of breeding animals were chosen in smaller range (fig. 3).

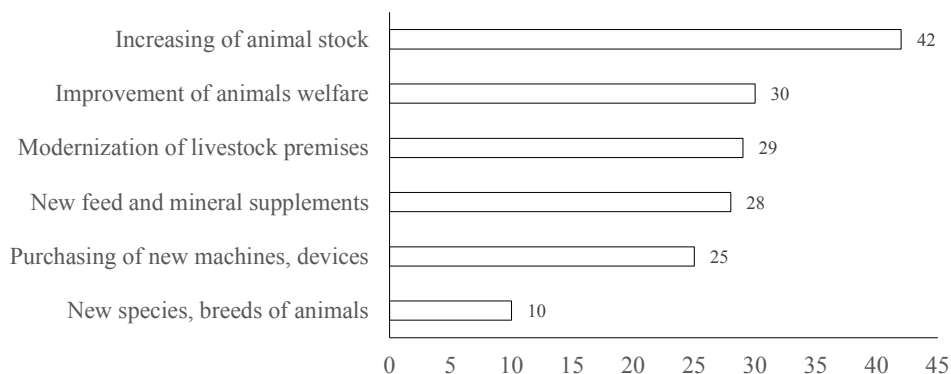


Figure 3
Innovations in animal production (% of indications)

Source: own study.

Opinions of the respondents in most of the cases were like the research conducted by Kałuza and Ginter³¹. It points out to the technological character of innovations implemented in animal production and aspiration of farmers to the improvements of scale economics and production potential. Innovative actions in this range, in the context of rationalization and growth of effectiveness of this branch, are justified and properly directed. It is worth to highlight the implementation of innovations connected with the improvements of animal welfare.

Classification of types of innovations implemented by the farmers due to the share of assets from ZWRSP confirmed the seen tendencies. Respondents concluded that the most important innovations in animal production were:

³¹ H. Kałuza, A. Ginter, op. cit., pp. 89–98.

increasing of animal stock, improving the animal welfare, modernization of livestock premises, usage in production new types of seeds and mineral supplements, purchasing of new machines and devices, implementation to the production new breeds or species of animals (tab. 4). The biggest differences were noted between farms using over 70% of assets from ZWRSP and the other groups. In the biggest farms, such situation was due to the size of plant production over animal one. It is worth to mention that the differences between various groups of farms (in all of the analyzed groups of innovations) may occur also because of the initial state and perspective prepared by the owner about the functionality in the future.

Table 4

Innovations in animal production in examined farms with consideration of sharing of assets from ZWRSP (% of indications)

Specification	Share of ZWRSP in farm assets			
	up to 25%	26–50%	51–75%	above 75%
	(% indications)			
Increasing of the livestock numbers	51	44	30	0
Purchasing new machines, devices for animal production	28	25	10	29
Improving of the animal welfare	34	33	20	14
New feeds and mineral supplements	33	25	15	14
Modernization of livestock premises	33	33	20	14
New breed and animal species	10	11	5	0

Source: own study.

Summary

Generic range of innovations implemented in farms using ZRWSP in warmińsko-mazurskie voivodeship is in substantial part appointed by production potential and present profitability of every agriculture activity. Results of conducted research point out that the general-economic type of innovations were preferred and introduced in plant production. Less pressure was put on innovations for animal production. It is the result of poor profitability of pig and milk production, causing limited involvement in strategic investments in this range. The positive fact is about using the computer tech in farms as one of the most popular kind of general-economic innovations implemented. For the tested owners the most important factor were the innovations in scope of intellectual capital and managing the work potential. High grades were assigned to the better preparations of farm owner to managing and hiring seasonal workers. Specifying the range of

innovations in plant production, the most of implemented were: new means of plant protection and usage of new species of plants. As the civilization progresses, the importance of yield is attributed to the changes (biological progression) and the chemicals used for plant protection from pathogens. It inclines the agricultural producers to get interest in progress in this range. Within the range of animal production, the most common innovations implemented were the ones about increasing the number of livestock and improving the welfare of animals.

When considering the influence of farm size and share of assets from ZWRSP, it was stated that the biggest differences were in general-economic innovations. Big Households were using in bigger size the marketing innovations, as the ones of searching the new I better ways of selling the products or ways of promotion. From the point of view of further improvements of innovativeness of farms, it is important to begin by the big household's cooperation with R&D units. It creates the possibilities to increase the tempo and range of diffusion of innovations from the place of their origin to the subjects which are interested in their implementation. In a case of innovations of plant and animal production, intergroup diversification of range of implemented innovations was relative smaller.

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SUMMARY

The level of innovativeness of business subjects and the types of innovations implemented by them depends from their size. Farms using assets of agricultural property of the country treasury (ZWRSP) have over average production potential. They are in a natural way predisposed to conduct the innovative activity. In the article the generic scope is discussed and the meaning of implemented changes in farms using the assets of agricultural property of country treasury, localized in warmińsko-mazurskie voivodeship. Empiric material was the result of surveys conducted in 138 agricultural holdings during June-July in 2016. Main attention was directed to the diversity of gained answers in dependence of scale of leased lands and correlated with it size of farms surfaces.

STRESZCZENIE

Poziom innowacyjności podmiotów gospodarczych oraz rodzaje innowacji przez nie wdrażanych zależy od ich wielkości. Gospodarstwa użytkujące zasób własności rolnej Skarbu Państwa (ZWRSP) dysponują ponadprzeciętnym potencjałem produkcyjnym. Są one zatem w naturalny sposób predystynowane do prowadzenia działalności innowacyjnej. W artykule omówiono zakres rodzajowy i znaczenie wprowadzanych zmian w gospodarstwach użytkujących zasób własności rolnej Skarbu Państwa, zlokalizowanych w województwie warmińsko-mazurskim. Materiał empiryczny stanowiły wyniki badań ankietowych przeprowadzonych w 138 gospodarstwach rolniczych w miesiącach czerwiec–lipiec 2016 r. Główną uwagę zwrócono na zróżnicowanie uzyskanych odpowiedzi w zależności od skali dzierżawionych gruntów i skorelowanej z nią wielkością powierzchni gospodarstw.

Key words: innovations in agriculture, types of innovations, land lease

Słowa kluczowe: innowacje w rolnictwie, rodzaje innowacji, dzierżawa gruntów

Chapter III

Europe

